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TITLE
A Co-operative spectrum sensing using Hetnet and OFDM in Cognitive Radio

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ABSTRACT:

Cognitive networks are programmable and dynamic nature, which help to use the spectrum effectively. In Cognitive Radio, Spectrum sensing, spectrum allocation, and reuse scenarios approach with the different algorithm which improves the utilization of the spectrum. Hence, in this paper the spectrum sense and allocate by gazer node to other users. The new technique brings more efficiency in achieving spectrum utilization. The data collision in network overcome by Gazer based cognitive radio network which provides more freedom for frequency sharing paradigm. Lot of communication technique available for improving the spectrum sensing and it is the one of the techniques to improve the improve the spectrum sensing. OFDM is used in the system, to reduce the interference happens in the network. By this method the throughput, packet ratio efficiency, bit rate and also residual energy are improved.

A Co-operative spectrum sensing using Hetnet and OFDM in Cognitive Radio

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Abstract: **Cognitive networks are programmable and dynamic nature, which help to use the spectrum effectively. In Cognitive Radio, Spectrum sensing, spectrum allocation, and reuse scenarios approach with the different algorithm which improves the utilization of the spectrum. Hence, in this paper the spectrum sense and allocate by gazer node to other users. The new technique brings more efficiency in achieving spectrum utilization. The data collision in network overcome by Gazer based cognitive radio network which provides more freedom for frequency sharing paradigm. Lot of communication technique available for improving the spectrum sensing and it is the one of the techniques to improve the improve the spectrum sensing. OFDM is used in the system, to reduce the interference happens in the network. By this method the throughput, packet ratio efficiency, bit rate and also residual energy are improved.**

Keywords— OFDM, Cognitive Radio, Spectrum Sensing, Gazer Node, Hetnet.

I.INTRODUCTION

An organized multi band range detecting strategy for versatile and geologically scattered cognitive radio networks (CRNs), alluded to as gazer node, is proposed. The objective is to recognize the range gaps and to detect every secondary user (SU) a detecting channel with the most extreme likelihood of being void. In geologically scattered CRNs, channels accessibility differs over the space and this makes the detecting results and detecting assignments area subordinate. Be that as it may, if SUs are not outfitted with area discovering advances, melding the detecting results to locate the ideal range detecting assignments for the following detecting time winds up noticeably trying for the base station. To handle this issue, we present a metric exclusively in light of the detecting results of SUs. Utilizing this metric alongside a low-many-sided quality bunching calculation empowers the base station to proficiently isolate the system into groups[2]. Further, a versatile learning calculation takes the dynamic conduct and diverts inhabitable of the primary system.

Cognitive Radio (CR) is a radio that can be modified and designed powerfully to utilize the best remote directs in its region to evade client obstruction and clog. Such a radio consequently recognizes accessible directs in remote range, at that point there needs to be changes in its transmission or gathering parameters to permit more simultaneous remote correspondences in a given range band at one area. This procedure is a type of dynamic range administration. In light of the administrator's charges, the psychological motor is equipped for arranging radio-framework parameters. These parameters incorporate "waveform, convention, working recurrence, and systems administration.[3]

The capacities as a self-ruling unit in the interchanges condition, trading data about the earth with the systems and it gets to other cognitive radios (CRs). A CR "screens its own particular execution constantly", notwithstanding "perusing the radio's yields"; at that point it utilizes this data to "decide the RF condition, channel conditions, interface execution, and so on.", and changes the "radio's settings to convey the required nature of administration subject to a fitting blend of client pre requisites, operational restrictions, and administrative imperatives"[25]. Cognitive Network is a standout amongst the most winning advancement bearings later on organized, it is noticeable in upgrading the use of the system asset. In spite of the fact that the examination on steering system in Cognitive Network emerges more consideration in the current years, the present component gives constrained techniques to enhance the precariousness execution caused by the versatility of the Cognitive Radio Users.

II. LITERATURE SURVEY

1. COGNITIVE RADIO USERS ADMISSION AND CHANNELS ALLOCATION IN 5G HETNETS: A COLLEGE-BASED MATCHING AND AUCTION GAME APPROACH

In 2019 International conference on Wireless Network Mennatallah.A.Rostom published that the introduction of cognitive radio technology in licensed 5G networks could significantly enhance the overall system capacity and number of served users. In this context, this work discusses the admission of new cognitive radio secondary users (SUs) in the fifth generation (5G) Heterogeneous Networks (HetNets) as well as the allocation of the channels over the secondary cognitive network, using a many-to-one matching game and auctions theory. Simulation results show that the used matching algorithm for users admission is of low complexity as well as the existence of a Walrasian equilibrium point for the channels allocation problem.

2. Spectrum Sensing Review in Cognitive Radio

CR transmitter not having capability to identify the transmission from primary user transmitter, due to incumbent transmission range placed outside range, it means SNR of CR system is always below the level of CR transmitter detection threshold. Hence CR transmitter identifies is channel as free and decides to transmit to incumbent, incumbent receiver affecting interference problem, and called as hidden node problem. Tn this strength of signal always differs with the help sensor location, and poorest fading measurements, it can avoided when several sensors are placed in various spatial locations to measure sensing values, this is main spatial diversity

advantage, and it is also used for total detection performance improving.

3. Spectrum Sensing Methodologies in Cognitive Radio Networks

Major challenge in CR is Spectrum sensing. Spectrum sensing can be defined as follows. To detect the primary user's (PUs) presence in a licensed spectrum and leave the frequency band as fast as possible to avoid interference with PUs. Different methods are used to identify the presence of primary signal. Spectrum sensing technique can be summarized as two. Direct technique and Indirect technique. Direct Technique: Signal approach can be used for the estimation. It is also known as frequency domain approach. Indirect Technique: The auto correlation of the signal is used for estimation. It is also known as time domain approach.

4. Study on cognitive radio in IEEE 802.15.4 wireless sensor networks

In this paper, they have proposed the zb-CRSN based on IEEE 802.15.4 wireless sensor networks. The FDIC and SITF algorithm in zb-CRSN could aid in selecting available licensed channel for sensor nodes from more than one spectrum sensing results. Moreover, the SITF algorithm refers to previous sensing results and chooses the channel which has the shortest duration of idle state kept as the selected available licensed channel. The results obtained by the simulation experiments show that the SITF has better performance than others.

5. Spectral Sensing Method in the Radio Cognitive Context for IoT Applications

Cognitive radio aims to use the unused spectral spaces called spectral holes . In order to develop cognitive capacity there are three basic processes that a cognitive radio performs described as follows. 1) Spectral Detection:Where a cognitive radio monitors the bands that are enabled and catch information in order to find spectral gaps.2) Spectral Analysis:Where a cognitive radio performs a characterization of the spectral holes that are monitored in the spectral detection.3) Spectral Decision:Where a cognitive radio defines the transmission rate and bandwidth in order to use the spectrum according with the characterization of the spectral detection and its analysis.

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6. RF spectrum sensing receiver system with improved frequency channel selectivity for cognitive iot sensor network applications

Despite the excellent low-power operation, the SRR has poor channel selectivity, which makes difficulties in multi-channel environments. The channel BW is defined as the detectable spectral range from the received signal. In general, the SRR has a wide channel BW, even though the incoming signal spectrum is narrow. In order to apply for multi-channel IoT networks, the SRR needs to increase the number of channel BWs. The channel BW is determined by the comparator decision for the ED output made by the SRO. The envelope of the SRO output is mainly dependent on the shape of the quenching signal, because the mechanism of the SRO is similar to the AM modulation scheme. Therefore, the various spectral shapes of quenching signals are researched for rectangular, triangular, and sinusoidal waveforms. The decision threshold at the comparator is set to a specified spectral power, the channel BW is determined. The triangular pulse is more capable than the rectangular pulse in making a narrower channel BW. In the case of a sinusoidal wave, a narrower BW is expected, because it has an impulse spectrum at its carrier frequency.

7. CorteXlab an open FPGA based facility for testing SDR and Cognitive radio networks in a reprodcuible environment

In this contribution the authors demonstrate the remote accessibility to CorteXlab. A typical scenario involving several Nutaq pi-coSDR nodes is built and deployed live, highlighting the steps a user should follow to deploy his own experiment pico SDR platform allows using three design flows: BSDK(Board Support Design Kit),MBDK(Model Based Design Kit)and GNU Radio design flow.BSDK is the design flow adopted in the context ofCorteX lab testbed to enable HDL design and implementation of open source IPs for SDR systems. However,users who already have available Nutaq pico SDRs can develop their own FPGA-based baseband design according to one of those design flows. A pico SDR job developed according to BSDK or MBDK design flow must contain a bitstream targeting FPGA and an ANSIC program that should run on the computer.The latter uses the Nutaq EAPI, which is an open source library, distributed under GPL license. It allows developing software application, routing algorithms and MAC protocols. A GNU radio based design targeting picoSDR must contain the GNU Radio job that should run on the host machine. The matching bitstream is available on CorteX lab test bed and will be loaded on the FPGA by Minus. To configure and program a picoSDR, the node deployment tool has a standalone Xilinx and Digilent software tools to allow programming picoSDR remotely. Two typical scenarios involving several nodes are built and deployed live. The first scenario is based onIEEE802.15.4communication between two picoSDR nodes. The second scenario deals with an avoiding-interference use case where the previous two picoSDRs are communicating. while a cognitive MIMO-OFDM transceiver running on one picoSDR must avoid interference. Moreover, in both cases, apicoSDRis used as a GNU Radio based remote spectrum analyzer to forward the spectrum state to the end user.

8. A reliable energy efficiency dynamic spectrum sensing for cognitive iot networks

The Internet of things (IoT) will allow connectivity of network devices embedded with sensors that will undergo severe data exchange interference as the unlicensed spectrum band becomes overcrowded. By applying cognitive radio (CR) capabilities to IoT, a novel cognitive radio internet of things (CR-IoT) network will start to arise as a promising solution to tackle the spectrum scarcity problem in customary IoT network. CR is a form of wireless communication where a radio is dynamically programmed

and composed to detect the available spectrum channels for operation . This sophisticates the spectrum utilization efficiency of radio frequency while avoiding interference and overcrowding to other users. Energy efficiency in CR-IoT network should be formulated with care since the sensor nodes consume significant energy to support CR operations such as in dynamic spectrum sensing and switching. In this paper, the author shows that channel spectrum sensing to boost energy efficiency in a cluster like group of CR-IoT networks. We propose a two-way information exchange dynamic spectrum sensing algorithms to improve energy efficiency for data transmission in licensed channels. In addition, the concern of the energy consumption in dynamic spectrum sensing and switching, we propose an energy efficient optimal transmit power allocation technique to enhance the dynamic spectrum sensing and data throughput. Simulation results validate that the proposed dynamic spectrum sensing technique can significantly reduce the energy consumption in CR-IoT networks.

9. COOPERATIVE SPECTRUM MOBILITY IN HETEROGENOUS OPPORTUNISTIC NETWORKS USING COGNITIVE RADIO

A new concept of cognitive radio has been proposed. The authors consider a self-organized ad hoc network with nodes acting here as SUs, freely moving within the service area of a cellular network. The SUs, in general communicate among themselves using ISM band. In case of a bursty traffic, an SU may utilize a free channel of the underlying cellular network if it is available. The major challenge is the absence of any co-ordination between the two networks. This paper presents a collaborative framework of CR to make use of unused channels of the cellular network with significant reduction in the scanning latency and the scanning overhead. This approach requires a sophisticated cooperation protocol among the SUs. This cooperation has been done by exchanging control messages between the SUs using the common control channel in ISM band. On the one hand, with the advent of new smarter technologies, the bands of lower versions of cellular networks will be under-loaded, and on the other hand, in the age of Internet of Things (IoT), many small ad hoc networks will be in use around us. Under this paradigm, since the cellular network is now almost pervasive, this technology may be of great help to provide spectrum to ad hoc network users with minimum additional overhead on SUs and no additional infrastructure. Extensive simulation studies show that this cooperative approach helps to reduce the call drop rate, call block rate, and also the scanning overhead compared to the non-cooperative approach. It is assumed that channels are statically assigned to each cell of the primary cellular network. Initially, each SU in cell cj, with empty Lj, scans the whole spectrum to discover the busy channels within its cell and updates Lj. As it moves across the cells, it co-operatively exchanges the list with its neighbors and thus builds up a partial list of statically assigned channels for each cell it traversed so far, and the busy channels it discovered so far. When an SU in cell cj wants to send data, it scans the list Lj only to find a free channel. If not found, it updates Lj collaborating with its neighbor SU's, and again scans until there is a success, or the call is blocked after a time out. Hence, in the worst case, an SU may have to scan all the channels statically assigned to a cell only, instead of the entire cellular spectrum, and thus saves the scanning overhead significantly.

10. PERFORMANCE OF AN IMPROVED ENERGY DETECTOR IN MULTI-HOP COGNITIVE RADIO NETWORKS

Here we replace the conventional energy detector by an improved energy detector for enhancing the performance of CR. Performance analysis of multi-hop cooperative diversity is discussed using an improved energy detector. We introduce a framework to derive a closed form expression of optimal number of multi-hop cooperative diversity branches by minimizing the total error rate. An efficient quick spectrum sensing algorithm is proposed which requires fewer than the total number of cooperative multi-hop diversity branches.

11. A SOFT DECISION SCHEME AGAINST INTERMITTENT SSDF ATTACK IN COOPERATIVE SPECTRUM SENSING

Sequential probability ratio test scheme (SPRT) is considered as a powerful approach to improve the sensing decision for cooperative spectrum sensing. Consider secondary ring the binary sensing behaviours of users (SUs), a novel trusted sequential probability ratio test scheme based on beta function (BSPRT) is proposed in this paper to avoid the intermittent spectrum sensing data falsification (ISSDF) attack. Multiplicative decay factors are introduced to mitigate the harmful effect of malicious SUs in the process of the soft-decision data fusion, and thus improving the accuracy of the final sensing decision.

12. THRESHOLD OPTIMIZATION OF A FINITE SAMPLE-BASED COGNITIVE RADIO NETWORK USING ENERGY DETECTOR

We propose selective and semi-selective soft combining schemes for this set-up. By minimizing the total probability of error in sensing a spectrum hole. We also discuss the optimization of conventional non-selective soft and 1-bit hard combining schemes with multiple collaborative CRs under the total probability of error minimization criterion.

13. THE STABLE ROUTING PROTOCOL FOR THE COGNITIVE NETWORK.

In this paper, we propose the Stable Routing Protocol (SRP), with Link Availability Prediction mechanism at the same time concerning the link quality and the traffic load for the nodes. SRP enables the Available Prediction mechanism for predicting the link available time and SRP prefers the link with longer available time. The longer link available time, the more stable the link is. In SRP, the senders broadcast the data packets in the medium, but the forwarders with longer available time, better link quality and light load possess the priority to relay the packets. Each sender in SRP tries to push the packet closer to the destination. The evaluation indicates that SRP performs better in terms of throughput and the end-to-end delay.

14. PERFORMANCE EVALUATION OF RSSI-BASED TRANSMITTER IDENTIFICATION USING USRP.

Primary User Emulation (PUE) attack is one of the most common attack in the physical layer of the Cognitive Radio Networks (CRN). In order to defence PUE attack, we propose a transmitter identified method based on RSSI of vary frequency to indentify transmitters located in different positions. We use Universal Software Radio Peripheral (USRP) as the transmitter and receiver to verify our method in an indoor environment. Experiment results show that our method can identify transmitters with different locations reliably.

III.Proposed System

Initially, all the primary and secondary nodes are scattered. The scattered secondary nodes are grouped based on the location that present and it is referred as zones. Each zone is assigned with a gazer node. The node with maximum connectivity with other nodes is selected as gazer node. The gazer node senses the spectrum that are currently used in network to carry out communication. The best spectrum is chosen by gazer node for other secondary nodes to initiate communication. If the free channel count is greater than channel request the direct communication is performed, else the communication was routed through gazer node in TDMA manner.

IV.CONCLUSION

This paper we give the outline view of existing systems which shows that with the help of geyser node the cognitive radio not only clustering the secondary networks but it also collaborates the primary networks and the geyser node acts as a watchman allocation the channels to the desired networks and in a efficient way. This increases the speed in which the network is operating. A cooperative spectrum sharing is used for maximizing the spectrum of the secondary user so the spectrum sensing will be takes place with the help of gazer node where the OFDM is used. The Hetnet used here mainly for the multi path routing and backhaul technique is used for communication. And also to reduce the loss, MIMO and OFDM will be used in the System. The future scope of this work is many zones can be created and efficiency of the secondary spectrum can be improved by implementing new algorithms and more good sensing techniques will be easily implemented. The sensing can done fast in future and time delay can be overcome in future.

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TITLE

POWER MANAGEMENT SYSTEM FOR HYBRID SOLAR PV- WIND ENERGY USING BIDIRECTIONAL AC/DC MICRO GRID

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ABSTRACT:

This Hybrid Solar PV-Wind Power generating system is coupled with Hybrid AC/DC Micro Grid, which have high reliability, high efficiency, low harmonics, low emissions & affordable cost. In this research, a Robust Optimal Power Management System (ROPMS) for an hybrid AC/DC Micro Grid is proposed to satisfy the power demand. The optimisation is formulated by Mixed Integer Linear Programming (MILP) method, by taking the uncertainties in resource output, power generation forecast errors, static & dynamic constraints into an account. The proposed system gives at most power utilization in an efficient manner by reducing the conversion losses by using only one bi-directional ac/dc converter. Since in this system ac power generation is directly utilized to the ac loads and dc power generated is directly utilized to the dc loads so there by storage and conversion losses and transmission losses is reduced to far extent. The effectiveness of the proposed system is evaluated by large number of simulations runs based on dynamic model of the dynamic resources. This system is recommended for individual houses on remote areas. This system will work on both isolated and grid connected mode in order have power supply even if the power generation is insufficient and also to feed the excess power generated during favourable conditions or when there is no usage of power.

POWER MANAGEMENT SYSTEM FOR HYBRID SOLAR PV- WIND ENERGY USING BIDIRECTIONAL AC/DC MICRO GRID

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***Abstract*— This Hybrid Solar PV-Wind Power generating system is coupled with Hybrid AC/DC Micro Grid, which have high reliability, high efficiency, low harmonics, low emissions & affordable cost. In this research, a Robust Optimal Power Management System (ROPMS) for an hybrid AC/DC Micro Grid is proposed to satisfy the power demand. The optimisation is formulated by Mixed Integer Linear Programming (MILP) method, by taking the uncertainties in resource output, power generation forecast errors, static & dynamic constraints into an account. The proposed system gives at most power utilization in an efficient manner by reducing the conversion losses by using only one bi-directional ac/dc converter. Since in this system ac power generation is directly utilized to the ac loads and dc power generated is directly utilized to the dc loads so there by storage and conversion losses and transmission losses is reduced to far extent. The effectiveness of the proposed system is evaluated by large number of simulations runs based on dynamic model of the dynamic resources. This system is recommended for individual houses on remote areas. This system will work on both isolated and grid connected mode in order have power supply even if the power generation is insufficient and also to feed the excess power generated during favourable conditions or when there is no usage of power.**

***Keywords*—Mixed Integer Linear programming (MILP),Maximum Power Point Tracking(MPPT), AC/DC Grid, PV-Wind, Remote areas, Individual houses, Isolated and grid connected modes, fuel cells, battery, dc loads and ac loads.**

INTRODUCTION

In the past few decades, the microgrid concept has gained popularity with the rapid increase of renewable energy sources (RES) and government policies to increase the use of eco-friendly resources. The microgrid conception was introduced by the association of Consortium For Electric Reliability Technology Solutions (CERTS) to boost the accuracy , viable and efficiency of the modern electric power system. A microgrid is associate degree aggregation of distributed generating units (DG), distributed energy storage (DES), sensitive and non-sensitive loads, and centralized/decentralized control system, operating as a controllable subsystem which can operate in grid-connected additional as in associate degree island mode of operation. Some examples of microgrid around the world are US-based Fort Carson which aims to harness over 100 MW renewable energy resources, Japan's fully functional microgrid at Mesa Del Sol and Sendai, and Santa Rita jail in California [1]. The converters used for microgrid operation is considered as grid feeding, grid forming, and grid supporting converters. Grid feeding device is functioned as a current supply with high parallel output resistivity capable of injecting real and reactive power to the utility grid. The amplitude and frequency of the output voltage of the voltage supply device (VSC) are ruled by the utility grid/ grid forming or supporting device. Grid forming device is operated as associate degree AC voltage supply with low series resistivity, in the islanded mode of microgrid operation, which sets voltage and frequency references for the microgrid in the absence of the main grid [2].

Grid supporting device will operate in each grid-connected further as in associate degree islanded mode of operation, includes the options of grid feeding and grid forming converters. Among the non-detachable distributed generation (DG) units, solar and wind energy based DGs are commonly found to be integrated into a microgrid. A dispatchable DG Grid supporting device will operate in each grid-connected further as in secondary degree islanded mode of operation, includes the options of grid feeding and grid forming converters. Among the non-detachable distributed generation (DG) units, solar and wind energy based DGs are commonly found to be integrated into a microgrid. A dispatchable DG like diesel generator with a flexible and controllable generation or an electric energy storage unit is an vital requirement in a microgrid with intermittent energy based DGs. Since, a microgrid with converter-based DG units has little or no inertia, the unexpected and unpredictable mismatch between power generation and load can be absorbed by using energy storage units in the islanded mode of operation. The most important control variables in the microgrids are voltage, active power, frequency and reactive power. Thus, the microgrid controllers are responsible for,

• Voltage and frequency regulation under any operating condition.
• Active and reactive power control to achieve proper power-sharing under grid connected as well as in the islanded mode of operation.
• A seamless transition from grid connected to an islanded mode and vice versa.
• Capability of black start in case of grid failure.
• Optimized operating cost of production and power exchanges with the utility grid [7].

For a reliable and stable operation of a microgrid with multiple DGs, an energy management strategy (EMS) is an essential requirement. The EMS distributes real and reactive power set-points to the DG units to allow proportionate and economic sharing of power among the DG units, balance generation with load, and maintain system frequency with a quick response to any disturbances and transients, and thus provide a unified transition from self-directed mode to grid connected mode of operation.

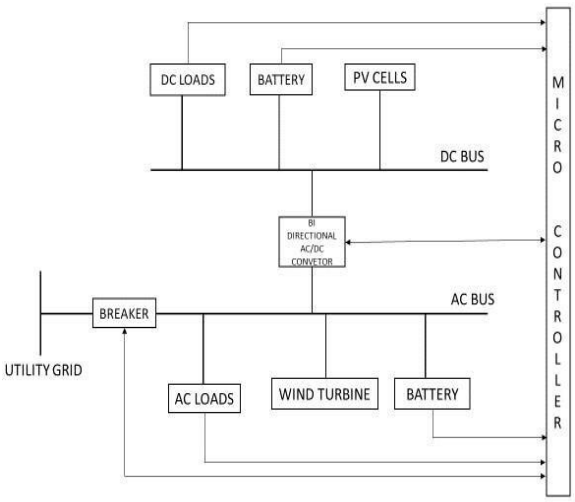
The control for parallel operation of uninterruptible power supply inverters is proposed in grid. The output voltage of every inverter should have same magnitude, frequency and phase angle for equal sharing of the load. However, due to physical differences between inverters and mismatch of line impedance, load sharing is not accurate. The droop control methods use local measurements for regulating voltage and frequency of AC microgrid [5],[6].

A typical centralized control hierarchy comprises three levels, which are as follows:
• At distribution network operator (DNO) and market operator (MO) level at medium and low voltages.
• The microgrid central controller (MGCC).
• Local controllers (LC)

The microgrid concept is gaining popularity with the proliferation of distributed generation (DG). Control techniques in the microgrid is an evolving research topic in the area of microgrids. A large volume of survey articles focuses on the control techniques of the microgrid; however, a systematic survey of the hierarchical control techniques based on different microgrid-architecture is addressed very little. The hierarchy of control in microgrid comprises three layers, which are primary, secondary, and tertiary control layers. A review of the primary and secondary control strategies for the AC, DC, and Hybrid AC-DC microgrid is addressed in this paper. Furthermore, it includes the highlights of the state-of-the-art control techniques and evolving trends in the microgrid research.The power supply monitoring system is mainly composed of the power supply monitoring module and the corresponding monitoring software. It has multiple current, voltage, and input and output detection functions, and is equipped with different communication interfaces to realize multi-point data collection and uploading through communication within the system.

LITERATURE SURVEY

A) ARCHITECTURE OF POWER MANAGEMENT SYSTEM FOR HYBRID SOLAR PV-WIND ENERGY USING BI-DIRECTIONAL AC/DC MICRO GRID



Hybrid AC/DC micro grid is proposed to reduce the processes of multiple DC-AC-DC or ACDC-AC conversions in an individual AC / DC grid. The hybrid grid consists of both AC and DC networks connected together by multi-bidirectional converters. AC sources and loads are connected to the AC network whereas DC sources and loads are tied to the DC network. Energy storage systems can be connected to DC or AC links. The proposed Hybrid Grid can operate in a grid-tied or autonomous mode. The coordination control algorithms are proposed for smooth power transfer between AC and DC links and for stable system operation under various generation and load conditions. Uncertainty and intermittent characteristics of wind speed, solar irradiation level, ambient temperature, and load are also considered in system control and operation. For the controller peripherals interface control (PIC) Microcontroller is used and MPPT and MILP algorithms are utilized to achieve the desired conditions in the operation of the control mechanism.

B) RELATED WORKS

Saroja kanti Sahoo [7] proposed a control aspects in AC, DC and hybrid AC-DC microgrid. The control aspects of microgrid are the most studied topics of interest. She says Without a stable and accurate control, the microgrid implementation is not feasible. Although AC microgrid has been a widely researched topic, DC and hybrid AC-DC microgrids are gradually gaining interest of the researchers from the perspective of reliability, minimization of converter-losses and efficiency. The control hierarchy of the three categories of microgrid follows a similar pattern, while the difference lies in the droop characteristics involved in the primary control, and the application of secondary and tertiary control for dissimilar operating modes in them. The heart of the microgrid control is the EMS in the case of centralized

approach. Once the central controller fails in its operation due to the communication error, the primary controllers too cannot be functional. However, in case of decentralized secondary control, there is no need for a centralized controller's command to operate primary controllers. The decentralized secondary control is less reliable than the centralized one, as the local controllers cannot function optimally due to lack of information about the system operating state [7].

Ariya Sangwongwanich [8] has presented the basic control of a three-phase two-level DC/AC power converters, where the detailed design of the PI controllers in the synchronous dc-reference frame was illustrated. First, the modeling of the three-phase DC/AC power converters was presented in terms of the current control loop in the dq-reference frame, the DC-link voltage, and the power control loop. The models enable the use of well-developed PI controllers to regulate the DC-voltage and the dq-axis currents for three-phase DC/AC converters, which have been demonstrated on a 10-kW three-phase grid-connected system. In respect to the control of single-phase DC/AC converters, similar modeling can be done, where a virtual system should be established in order to transform the AC control variables to DC quantities. A case study on a single phase converter is demonstrate to show the controllability in the αβ-reference frame [8].

Mohammad Abuhilaleh [9] proposed a power sharing strategy in hybrid AC/DC microgrid using droop control method. Three sub grids were connected together to form DC/AC/DC microgrid. These sub grids were linked by an interlinking converter. Such structure has not been previously investigated and would absolutely be useful for future development of renewable sources objective of the ILC is to manage the power flow between the sub grids according to the generation and demand parameters for each sub grids. Different scenarios of power flow were studied using MATLAB/ Simulink. The results confirm the applicability of the projected structure and control scheme. An experimental implementation of the proposed system should be the next step in further enhancing the results [9].

Farzad Mohammadzadeh Shahir [10] proposed, a new structure for boost dc-dc converter was applied with new hybrid system. It was obvious that the new boost dc-dc converter structure had proper performance. The IC algorithm was used for MPPT with a battery bank and bidirectional dc-dc converter to increase stability and reliability of load characterizes. This algorithm was considered under two different scenarios. Firstly, by considering radiations variations and constant value for its temperature, it was shown how the voltage and current of the load was controlled by application of a new dc-dc boost converter, a battery bank and a bidirectional dc-dc converter. Also, the simulation results was obtained in radiations constant and temperature variations state were shown how load characterizes could be constant. Meanwhile, it was shown that the dc link voltage was controlled at 700V due to appropriate performance of proposed control scheme [10].

Jih-Sheng Lai[11] proposed a high-efficient bidirectional ac-dc converter is for energy storage system. The proposed converter can transfer both active and reactive power between ac grid and dc sources. The proposed converter exhibits two distinct merits: (1) no shoot-through issues because the phase leg does not contain series connected switches, (2) the reverse recovery dissipation of the power switch is greatly reduced because the freewheeling current does not flow through the body diode of power MOSFET. The circuit consists of two power switches a1 and a2, two diodes D1 and D2, two inductors L1 and L2, and two split dc bus capacitors C1 and C2. The converter works as a rectifier when the power is transferred from ac grid to dc source. Alternately, it works as an inverter when the power is transferred from dc source to ac grid. The voltage across each capacitor C1 and C2 should be always larger than the peak ac voltage to ensure the circuit works properly throughout the whole line cycle. Along with the admittance compensation, a quasi proportional-resonant controller has been designed to significantly increase the loop gain at the fundamental frequency, while maintaining enough phase margins [11].

Fernando Ornelas-Tellez [12] proposed a system. It is worth remarking that in the microgrid control configuration, the power flow (PG) between the microgrid and the utility grid is based on the DC bus voltage regulation then, for controlling PG the inverter control system only requires the local information, i.e., the voltage at the DC node, for which the explicit representation of power interchanges between the microgrid subsystems, including the power losses in the power converters are not required. The complete control scheme of the inverter connected to the utility grid is portrayed where the combination of the optimal strategy and the ST controller is applied only for the utility grid connection, with the aim of enhancing the inverter control system robustness to deal with the disturbance [12].

Qiushi Li [13] proposed a system in which he says the complete DC power supply for building still needs a change. In the short term, the AC/DC hybrid power supply will be a more appropriate solution. The current AC/DC hybrid power supply system has not yet added the function of transferring DC power to AC power. Whether to join this function in the future depends on the scale of the system construction and future energy policies and related power regulations. The operation practice in the past nine months shows that the AC/DC hybrid power supply in the building can significantly reduce the rectification and inverter devices, making the control more flexible, reducing the network loss, and improving the reliability and economy of the system. By adopting a reliable and perfect protection approach and a reasonable energy dispatching strategy, the AC/DC hybrid power supply system is stable and reliable, and the self sufficiency of power consumption is realized to the greatest extent, which explores a feasible road for future green buildings. Due to the extensive application of power electronics technology and computer control technology, buildings using AC/DC hybrid power supply have more efficient and flexible scheduling characteristics and better user experience, and are of great consequence for promoting energy saving and energy conservation and sustainable energy development [13].

Year of publication	Title	Publication details	Technology used	Merits	Demerits
2017	Power Management of a Hybrid AC/DC microgrid	IEEE POWER ELEC., ISSN:1941-0171	BAAC BADC	Power consumption	Complexity
2017	Max.power from solar PV	IEEE,Sustainable Energy ISSN:1949-3037	SPP&O, Matlab	Maximum solar o/p	Complex,Commutation Burden
2017	Implementation of Environmental Decision Making Tool for RE Utilization	IEEE,ISSN: 978-1-5090-3843-5/17	SPA	Emission Reduction &Healthy Eco System	Costly
2017	Control of wind energy conversion based on modular multi level matrix converter	IEEE, Industrial electronics	Back-back topology	Multiple level wind energy conversion	Suitable only for high power application
2017	Study of hybrid storage system for a pv energy system	IEEE,ISSN: 978-1-5090-6450-2/17	Super capacitors	Improvement in ac/dc conversion o/p	Extended for bidirectional conversion
2016	Hybrid wind pv stand alone system	IEEE,Power system ISSN:978-15090-0128-6	Battery back up	Utilization of solar& wind	Suitable for low loads alone
2016	Energy mgt&control system for lab scale micro grid based wind-pv-battery	IEEE,Sustainable energy ISSN:1949-3037	Control algorithm	Efficient operation	A real time control system is to operate
2015	Robust optimal power mgt for hybrid ac/dc micro grid	IEEE,Sustainable energy ISSN:1949-3037	Hybrid power system	Less voltage loss& low harmon-ics	Bidirectional converters are better
2012	On-grid hybrid wind/pv energy system	IEEE.Power&energy ISSN:978-1-4673-4584-2	DC bus grid	Simple control	Suitable only for small scale

In this paper [16], conventional power systems are evolving to modern smart grids, where interconnected microgrids may dominate the distribution system with high penetration of renewable energy and energy storage systems. The hybrid AC/DC systems with DC and AC sources/loads are considered to be the most possible future distribution or even transmission structures. This paper propose the topology and control schemes of hybrid AC/DC microgrids are reviewed. Various structures of hybrid AC/DC microgrids (AC-coupled, DC-coupled, and AC-DC coupled) are discussed, and real world examples of different types of hybrid microgrid are presented.Therefore, a thorough review and discussion of different control schemes and power management approaches of different types of microgrids under different operation and loading conditions are conducted in this paper. Implementation examples of some representative control schemes are presented to better demonstrate the power management strategies. At last, discussion and recommendations about the future research directions on AC/DC hybrid microgrids and power management strategies are provided [16].

Here we can see that several converting components such as ac/dc converter, ac/ac converters, dc/ac converters and ac/dc inverters are used, these components makes the system less efficient by the losses occurred during the conversions and transmission. In this system the converters and inverter should perform harmonically in order to avoid interferences since it is not possible practically, so any how it has some interferences in the bus which may cause several issues and loss of power. we know that ac power transmission is preferred instead of dc power transmission in order to reduce the transmission loss as transmission of dc power for long distance makes difficult and power loss is huge, but here we are micro grid and the distance of transmission is very low and implemented in the house itself so using dc power line should be preferred and makes more secure since the voltage is low when compared to the ac power line and in the range of secure level which does not cause any serious harm to humans, more over using dc powered appliances reduces the power consumption ,but all the advantageous things are not present in this system which in turn makes the system unworthy of implementation and its efficiency and performance is low. The converting components used in the system requires frequent observance and maintenance. In this system there is no feedback of power into utility grid, since in an year on favorable conditions we get power generated execs that can be feedbacked to the utility grid, by the absence of this mechanism power generated is wasted. All these disadvantageous things is to be rectified in order to achieve greater efficient system.

METHODOLOGY

Here we are using controller peripherals interface control (PIC) Microcontroller for controlling this whole system and the MPPT algorithm is used in the controller design for PV system and MILP(Mixed integer linear programming) algorithms are utilized to achieve the desired conditions in the operation of the control mechanism.

Proposed system-:) Hybrid AC/DC micro grid is proposed to reduce the processes of multiple DC-AC-DC or

AC-DC-AC conversions in an individual AC / DC grid. The hybrid grid consists of both AC and DC networks connected together by multi-bidirectional converters. AC sources and loads are connected to the AC network whereas DC sources and loads are tied to the DC network. Energy storage systems can be connected to DC or AC links. The proposed Hybrid Grid can operate in a grid-tied or autonomous mode. The coordination control algorithms are proposed for smooth power transfer between AC and DC links and for stable system operation under various generation and load conditions. Uncertainty and intermittent characteristics of wind speed, solar irradiation level, ambient temperature, and load are also considered in system control and operation.

PERFORMANCE IMPROVEMENTS

Overall Efficiency of the System is improved by Reducing the Conversion Losses. Since the length of the transmission line from power generated is reduced and the thickness of the wire used for transmission is increased by this voltage drop is reduced to a far extent. This system is best for Remote Area Power System (RAPS).The Hybrid Micro Grid makes the System more Resilient and improve the overall system. The Hybrid Micro Grid Lowers the Network Redundancy. Micro Grid Can be connected with Main Grid or removed from that at any time**.**

CONCLUSION

This paper briefly explains about the efficiency of using hybrid power generation source and efficiency of hybrid ac/dc grid. since the conversion losses is reduced to far extent it makes the system more efficient when compared any other system. The Mixed Integer Linear Programming used in the micro controller makes the power generated utilize properly and also provides at most satisfaction to the beneficiary by its operations proposed. The overall cost of the entire system is affordable to an average middle class family also so it makes the system cost efficient too. Coming to the point of maintenance no much maintenance is required since the resources of power generation is PV and Wind Turbine, only the storage systems requires periodic maintenance. The system is recommended only to the individual house with minimum of 1000 sqft of area for island mode usage, and the area of PV array can be reduced as per requirement of power if it is ok to draw power from utility grid for day to day power requirement.

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TITLE
THREAT INTRUSION DETECTION BASED ON FACE RECOGNITION USING HAAR CASCADE

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ABSTRACT:

In this paper, security and authentication is an imperative part of many industry. In Real time, Human face recognition can performed in two stages such as, Face detection and Face recognition using raspberry pi. This paper implements "Haar-Cascade algorithm" is used to identify human faces which is organized in Open CV by Python language "and "Local binary pattern algorithm" to recognize faces. Collating with other existing algorithms, this classifier produces a high recognition rate even with varying expressions, efficient feature selection and low assortment of false positive features. Haar feature-based cascade classifier system utilizes only 200 features out of 6000 features to yield a recognition rate of 85-95%. Also as an addition sensing is done to begin the process so that power consumption is minimized.

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Key words : face recognition, raspberry-pi, Haar – Cascade, LBPH, Open CV, recognition rate

I-INTRODUCTION

Biometric is the application of mathematical and statistical methods to the study of biology. In recent years the technology has been applied to the machine identification of humans from a personal trait or characteristic. It's probably more accurate to describe the aims of the technology as the verification of an identity because a statistically based system will provided. Many biometrics, including fingerprints, facial features, iris, retina, hand geometry, handwriting, and voice, have been used for the identification and verification of individuals. Each biometric has its own disadvantages and advantages, and choosing the best one for a specific application is influenced by both performance criteria and operating environment. For the anti-theft, face recognition is a good choice , because it is based on passive vision techniques and can work in different light condition. Especially, it can sense and send a SMS and mail to police or authorized person through communication

networks. [1]

To identify the individuals, a IR sensor and Surveillance camera with face recognition system can be provided. Face recognition system has the dexterity to mitigate the danger and ultimately ward off any future assault from happening. There are countless applications for this Face recognition system over the world. It has also elevated in applications like facebook, instagram and in many social media platforms. It will suggest the user to tag the person who has been detected in images. The Fig.1 represents the steps taking place in face recognition. There are three steps: face detection, face extraction and face recognition.

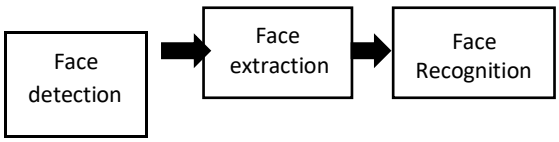

Fig.1 : Face recognition steps

The main target of this paper is to get high recognition rate and cost efficiency with low power consumption. In this paper, Section II deals with related work and Section III explains the methodology in detail and finally comes the results and discussion part.

Linear binary pattern histogram is mainly preferred for “Feature extraction”. It operates with powerful discrimination. The features from the image will get extracted in live stream using this algorithm .Linear Binary Pattern Histogram algorithm has two steps, training period and evaluation period. The process in training period is to train the image samples to be recognized and subsequently in estimation period, the image to be tested will be compared with the samples trained in dataset [2].

II-Related work the scope of image recognition analysis, computer vision and pattern recognition. The requirement of identifying an authentic owner or user through different authentication mechanisms is increasing rapidly following by the intense concerns about the security and rapid advancement in networking area, communication and mobility. Face recognition is an area which has attained attention over the last few decades and need for it increasing rapidly. Traditional applications of face recognition, especially those which are used for access control, authentication and surveillance, usually need maximum information about the face to attain exceptional performance in their recognition. Occasionally it is very difficult to get access of their full face under certain restricted situations. DFM has their promising application in various face video recognition in future. Recent research works are mostly on the CNN based approach, which can be enhanced in the future purposes[4].

Partial face images are likely to be captured due to occlusions, out-of-view, and large viewing angle e.g., video surveillance and mobile proposes a novel partial face recognition approach, called Dynamic Feature Matching (DFM), However, a little attention has been paid to partial face recognition so far and thus this problem of recognizing an arbitrary patch of the face image remains largely unsolved which will combine Fully Convolutional Networks (FCNs) and Sparse Representation Classification (SRC) address the partial face recognition problem regardless of various face sizes. Performance of DFM is also impressive in partial person reidentification on Partial RE-ID and iLIDS databases. The source code of DFM and the Framework of DFM will obtain accuracy in single-shot experiment increases from 25.9% to 27.8% after facial feature representations of multi-scale are considered, and same for multi-shot setting (29.0% to 32.4%). Such kind of experiment results suggest that multi-scale representation is useful in DFM for partial face recognition algorithms and achieve 92.81% and 93.75%devices[5].

Now a days monitor systems are ubiquitously deployed in public areas. However, monitor systems face a major challenge regarding the long-distance object recognition. Super-resolution constitutes with the popular choice to address this challenge. Since the super-resolution methods are used in many applications, those are necessary to understand these types and make a comparative study of them as improvement. In this paper, we perform a comparative study on the six super-resolution methods over two recognition algorithms. This paper evaluates super-resolution performance based on recognition accuracy, and serves as the summary assessment of image super-resolution algorithms. VDSR method improves performance by 8.75% and 7.5% in accuracy compared with that of Bi-cubic method for the following[6].

III-Methodology

A.System implementation

In Raspberry pi to stream a live stream video Web camera is connected. The captured image from the web camera will get detected first and then cropped to reach the computer. This detection is performed through Viola-Jones Haar cascade classifier[7]. Using a python-based Open CV software, face is saved in Raspberry Pi and forwarded to the available servers which are Linux-based. Whenever an image arrives, the server commences LBPH algorithm on this face, evens-up the image to minimize the variations and finally compares the emanated LBPH from detected image with the pre-saved LBPH in the database. The result of comparison is generated by sending a notification as authorized or unauthorized person via Internet of Things (IOT)

B.Block diagram

From fig.2 , through the web camera the input image will be captured. In that, the image will cropped into rectangular boxes and every box will be compared to detect the human face. As once the face is detected, that face will be compared with the stored images in the datasets. Every image captured will be stored as grey scale.by this the face will be recognized. Comparision will takes place to identify the person as authorized or unauthorized.

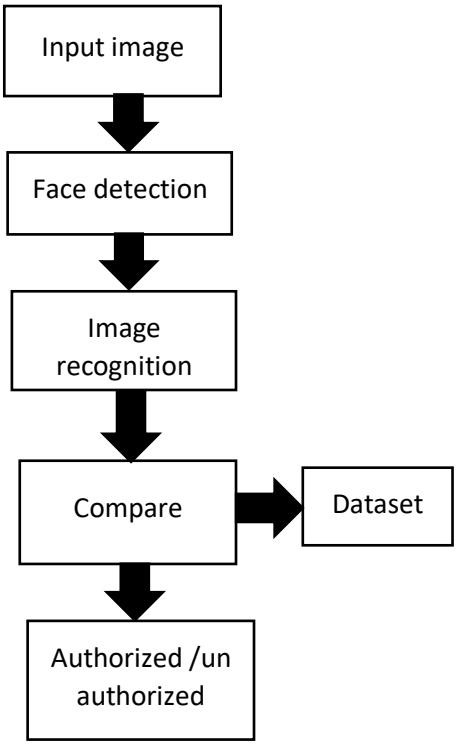

Fig.2 : Proposed Block Diagram Of Face Recognition

If the person is authorized no action will be taken but if the person is unauthorized then the process will begin by sending an alert SMS and mail to the authorized person or owner and also to the cop server. To capture the burglar the a motor will activated to pump an eye irritating gas. Every process will happen only after the comparision of captured image with the dataset saved.

The three main processes followed in face recognition system are Detection, Feature extraction and Comparison.

C.1 Face detection

For face detection, Viola Jones algorithm is a beneficial method. In general, this algorithm is not only limited for face detection but can also be utilized for many rigid structured object detection tasks. The Viola-Jones algorithm is composed of three main concepts that make it possible to develop a real time face detector: Haar-like features, Image integral, Adaboost training and Cascading classifier. By applying these features, the system can determine the presence or the absence of a human

face

C.2 Haar-like features :

Haar-like features is used by Haar cascade classifier for human face detection. There are three formations of Haar-like features. From the Fig.3, the first format is the edge feature, second type is the line feature and the last type is the diagonal feature. Using the integral image, Haar like principle will provide fast computation. It's called Haar-like features[7].

The Algorithm looks for specific haar feature of a face. This detection takes the image and converts it into 24X24 window and smears each Haar feature to that window pixel by pixel. Initially, the algorithm requires a lot of positive images (images of faces) and negative images (images without faces) to train the classifier.

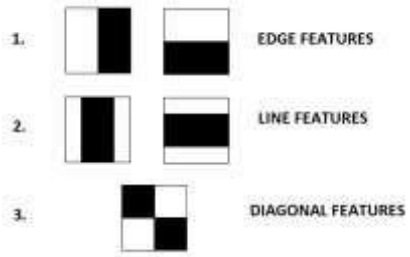

Fig.3 : Haar like features

Then, these features are extracted. Features are numerical values determined from images that are used to distinguish one image from another each feature is a single value acquired by subtracting the sum of the pixels beneath the white rectangle from the sum of the pixels beneath the black rectangle [6]. Feature = Σ (pixels in black area) - Σ (pixels in white area) (1) dark white All possible sizes and locations of each kernel calculate a plenty of features. A 24×24 window results in over 160,000 features. For each feature calculation, it is necessary to find the sum of the pixels under the white and black rectangles. To solve this, the concept of integral image and adaboost algorithm is utilized, which

reduces 160000 features to 6000 features

C.3 Integral Image

From fig.4, Rectangle features can be determined rapidly via an intermediate representation of the image called the integral Image. The integral image comprises of small units representation of a given image

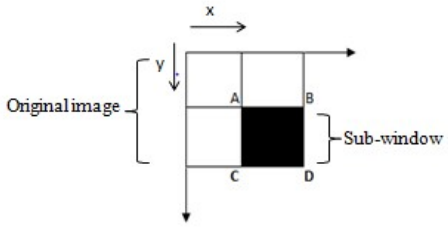

Fig.4 : Integral image schematic diagram

For example, the value of this integral image at position1 is the sum of pixels in rectangular A. The value at position 2 is A + B and so on. So, the sum total of pixels in rectangular D is:

S (D) = ii (4) – (ii (3) + ii (2)) + ii (1) (2)

5	4	3	8	3
3	9	1	2	6
9	6	0	5	7
7	3	6	5	9
1	2	2	8	3

Where, S(D) is the sum of pixels in the rectangular D only - which is the sum of pixels in the rectangle A + B + C + D, represented by ii(4); ii(3) is the integral image of rectangle A+C ; ii(2) is the integral image of A+B and finally ii(1) is the integral image of the rectangle A (the addition is executed since the region A is subtracted twice in ii(3)and ii(2)). The integral image is outlined as: ii [x , y] = i [x' , y'] (3) Where, ii[x, y] represents integral image, and i [x', y'] represents original image. The pixel value of integral images at any *(x,y)* location is the sum of all pixel values displayed before the current pixel. The integral value of an individual pixel is the sum of pixels on the top and the pixel towards the left. For example

5	9	12	20	23
8	21	25	35	44
17	36	40	55	71
24	46	56	76	101
25	49	61	89	117

Fig. 5(a): Input image

Fig. 5(b): Integral image

The image is integrated in fewer pixel operations, since the traversing begins from the top left towards the bottom right. This makes the calculation of the addition to the entire pixels within any specified rectangle using only four values. In the integral image, these values are the pixels that resemble with

the edges of the rectangle in the input image

C.2 AdaBoost Learning

AdaBoost is an adequate boosting algorithm which combines weak classifiers while reducing significantly not only the training error but also the more elusive generalized error. The main idea of Boosting lies in connecting the simple classifiers which are known as weak classifiers. Since the weak classifiers do not expect even the best classification function to classify the data well, they are called as weak classifiers. Here a classifier is combined with a single feature to easily link the Haar features with weak classifier. Haar-like feature is used as a threshold in AdaBoost learning algorithm by Viola and Jones. The Haar- classifier is the strongest classifier since it uses the strongest features. The positive and negative samples are best separated by the feature. In order to build a strong final classifier AdaBoost is used [8]. It reduces the features from 160000 to 6000, thus making the computation simpler and hence it is less in computational complexity.

C.3 Cascade Classifier:

Cascade classifier is a cascading of weak classifiers used to boost the face detection process and reduce the computational complexity. Each node in the series contains a weak classifier and filter for one Haar feature. AdaBoost provides weights to the nodes and the highest weighted node primarily arrives. When a filter ignores to permit image regions, that specific sub window of the image is eliminated for further processing. It is then considered as a non-face, which means that the image regions that are processed do not contain the face to be detected. This is very imperative to the performance of the classifier, since all or nearly all negative image sub-windows will be eliminated in the first stage.

On the contrary, when image regions successfully passed the filter, they go to the following stage, which contains a more complex filter. Only regions that successfully pass all filters are considered to contain a match of the face. This means that regions of the image contain the facial subject for detection. The reason behind the multi-stage classifier is to eliminate efficiently and rapidly the non-face subwindows. The classifier is used to reject more false positives (non-face regions) of the sub-windows. The number of false positive rate is drastically

reduced after several steps of processing

IV-Feature extraction and Comparison

After the face is detected, next step is to extract features this is done using linear binary pattern algorithm. Initial step of this algorithm is to convert the test image into gray scale. This L x M pixel size image will get divided into regions. The same pixel size is used for the regions, producing n x n regions. Each region will goes through Linear binary pattern operator. In this process, it will compare the center pixel with its neighbor pixels. If the pixel size is greater to center pixel it is ‘1’ or it is ‘0’.

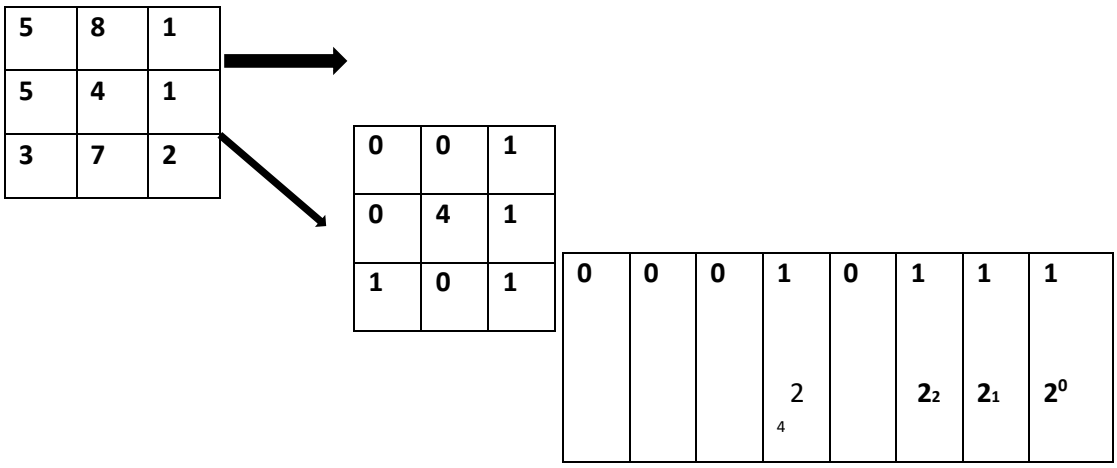

Fig. 6: LBPH algorithm example

Executing this process will result in 8binary values. By linking the binary values it results in binary number. The LBP value is obtained by translating 8binary number into a decimal number, it will be in the range of 0-255. This algorithm implementation is shown in the above Fig. 7. The histogram for each region is drawn using the LBP Values of each region. Each region will contain 256 cases. This implementation is shown in the below equation:

NX = x= (0,…., 255)

Where, Nx is a case of value x, Y (i , j) is the (i , j) pixel of Image and X is the conditional operator, providing '1' when it is true or '0'. After finding the histogram for each region, the sole histogram is created by uniting each region histogram. The final histogram is in the form of 256 *n *n cases and it is determined as the image feature vector [1]. The drawback of this algorithm is it has a fixed scale (3 x 3 scale). To overcome this, there is an extension of original LBP implementation to handle multiple neighborhoods. There are two parameters: first is 'p' which is the number of points in the symmetric circle neighborhood, second is 'r' the circle radius.

There is an important concept called LBP uniformity. A LBP is uniform if it has at most two 1-0 or 0-1 transitions, for example: consider pattern

10000000(1 transition) when

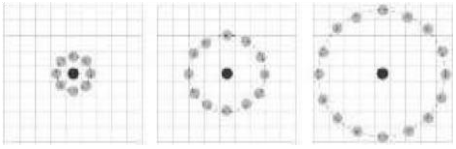

Fig. 7: Represents varying p and r to form a Local Binary pattern.

00100000(2 transitions) they both are uniform, the pattern 00100100(4 transitions) is considered as uniform. LBP uniformity completely depends on the 'p' value. When p increases resulting histogram dimensionality increases[8].

ALGORITHM	LDA	PCA	SVM with binary	CAMSHIFT	HAAR-CASCADE
RECOGNITION RATE	85%	88%	91.2%	93%	95%

TABLE III: PERFORMANCE ANALYSIS

Fig. 8a shows the performance analysis

From fig.8a ,the tabulation is given for the comparison of the algorithm used with the other algorithm. In this table, LDA,PCA,SVM with binary, CAMSHIFT algorithms are compared with the haar-cascade algorithm. Whereas the LDA and PCA has the least accuracy with 85% but the SVM and CAMSHIFT has a accuracy nearly 92% which is the existing system. In our project we have used haar-cascade since its accuracy is over 95% with the highest accuracy upto date.

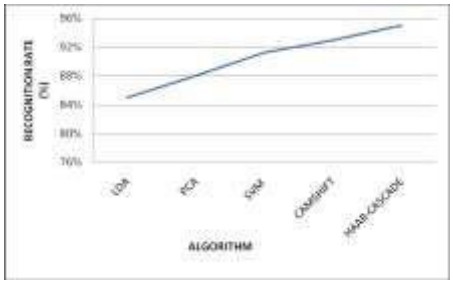

Fig. 8b : Performance analysis
(Algorithm vs. recognition rate)

from fig.8b, the performance analysis is given in agraph format for better understanding. In this graph,the x axis indicates the different algorithms used along with the haar cascade and the y axis represents the recognition rate in percentage. In this graphical representation we proved that the haar cascade algorithm has the the highest recognition rate compared with other algorithms already used in the face recognition. Thus face recognition with haar cascade algorithm is the best algorithm for the real time face recognition process.

Hardware design

Fig.9 :hardware

In this section, we discuss about the hardware design. The hardware design includes the selection of electronics equipment and the integration of all of components. Figure 9 shows the hardware design for the security monitoring

system. For processing module, we use the Raspberry Pi 3 model. The board is equipped with wireless LAN module for communication. IR sensor is connected to Raspberry Pi via USB cable. To capture the picture, USB web cam is mounted to the Raspberry Pi 3 via USB cable. To release warning, gas motor is connected to Raspberry Pi 3 through GPIO [11].

Software Design

After the hardware design, then we make a software design. The user starts to activate the system in Raspberry Pi 3. Movement detection is handled by

IR Sensor and send the value true or false to Raspberry Pi 3. Photo captured is triggered after IR sensor send data. Raspberry Pi 3 control the camera. For intruder detection, HOG and SVM are installed in Raspberry Pi 3. HOG is used to extract the features of human objects in the image. In the first step, the HOG method will convert RGB image (red, green, blue) to grayscale. Then gamma normalization will be done to calculate the result of the square root of each channel (red, green, and blue channel). Then, the gradient value of each pixel will be calculated by dividing it into 8x8 cells. The next process is to determine the number of orientation bin that will be used in histogram (spatial orientation binning). After that the normalization process of block 16x16 will be done cells to overcome the lighting changes. In this process there are blocks that overlap due to their shifting cells. The final process is to calculate the HOG feature vector. The resulting HOG feature will be processed using the SVM method to determine whether the feature is a human feature or not. The full process of human detection can be seen in the Fig. 4

V-Results and discussion

To obtain the authorized person, From fig.10 first the data set of the authorized person will be stored. The raspberry pi and the webcam is connected to the same hotspot to obtain the images of the authorized person. Over 30 images of face of the authorized person is captured and stored as datasets.

Fig .10 a : data set of images

More than one person can be stored as authorized person but only one person can be authorized during the process.

Fig .10b : Authorized person

Know raspberry pi will be connected with the camera, first the IR sensor will sense the motion in the room, if the motion detected, Face recognition process will take place. The captured face will be compared with the datasets. From fig.10b, If it is authorized person, green light will glow indicating access granted, No further actions will be taken.

Fig .10c : Unauthorized person

As the same face recognition will take place, If the captured person is unauthorized, now their will be red light indicating the unauthorized person. Using internet of things, from fig.10c, a SMS and mail will be sent to the authorized person and after a minute a motor will be pump the gas which will capture the unauthorized person.

Fig. 11 shows the analogy between images and training period.

NO. OF IMAGES	1	4	8	10	16
TIME PERIOD (seconds)	2	4	10	16	25

We represent the number of images captured and the time taken for training period of the image captured. Normally for a captured image the time will be taken to detect the face in the image and then the recognition will take place after the face will be compared with the datasets stored after that only the intruder will be identified as authorized or unauthorized. So for all this a particular time will taken as shown in fig.11

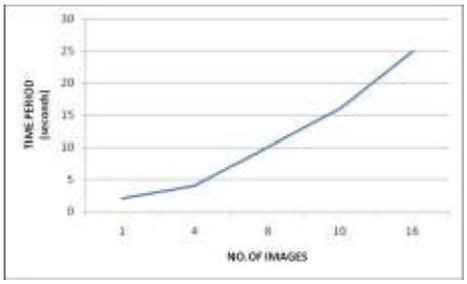

Fig. 12 : Training period for different images
(Images vs. Training period)

A graphical representation is given for the number of images captured and also with time taken for the image to capture and recognize as authorized person.if the captured image is less,then the time taken is also less.when the images count increases then the time taken for the recognition also increases. In this graph ,comparison is done between the number of images and time period inseconds.as shown in fig.12.

VI-CONCLUSION AND FUTURE WORK

Security is an imperative part of any industry. This work is most particularly for criminal identification. The algorithms carried out in this paper were ViolaJones algorithm and Linear binary pattern algorithm[10]. The presented system will get implemented using Open CV and Raspberry pi. The recognition rate attained by this process is 90%98%. There will be deviation in the result on account of the distance, camera resolution and lightning. Advanced processors can be put

to use to reduce the processing time. By affixing more number of recognition servers to attenuate the processing time for collection of images

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TITLE

Intensive brain monitoring system based on EEG signal

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ABSTRACT:

Brain-machine interfaces allow humans to control technical devices through direct recordings of brain activity. To this end, the device – either intracranial (brain-implanted) or extracranial (fixed on the person's skull) – measures the brain activity of an agent, interprets ("decodes") the agent's intended action, and sends the corresponding execution command to an artificial effector system, such as a computer cursor, a prosthetic limb, or a wheelchair . First clinical trials have demonstrated the success of the BMI principle for restoration of movement and communication (Birbaumer et al., 1999; Guenther et al., 2009) in paralyzed individuals.

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Intensive brain monitoring system based on EEG signal

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Abstract:- Brain-machine interfaces allow humans to control technical devices through direct recordings of brain activity. To this end, the device – either intracranial (brain-implanted) or extracranial (fixed on the person's skull) – measures the brain activity of an agent, interprets ("decodes") the agent's intended action, and sends the corresponding execution command to an artificial effector system, such as a computer cursor, a prosthetic limb, or a wheelchair . First clinical trials have demonstrated the success of the BMI principle for restoration of movement and communication (Birbaumer et al., 1999; Guenther et al., 2009) in paralyzed individuals.

Keywords-Segmentation, Landmark localization, U-net, Dense-net, Concealment, TRMbased error, Convolution Neural Network (CNN), deep learning, grab and cut, mammographic, tissue mimicking.

I.Introduction

The fNIRS is that the absorption of close to actinic radiation by Hb. the sunshine penetratres through the pinnacle and lends info concerning blood volume, flow and natural action. this system is safe and non-invasive. It are often utilized in addition to alternative imaging modalities. fNIRS is most sensitive to scalp and os. so as to own associate degree larger source-detector magnitude relation,superficial cortex ought to be high.The quantification of radical concentration resolved from the activity of close to infrared (NIR) lightweight attenuation is concerned in fNIRS. haemoprotein and deoxygenated- hemoglobin deoxy-Hb ar sturdy absorbers of sunshine.Oximeters has constant principle. In four alternative ways that actinic radiation will move with the brain tissue. variations within the absorption spectra of deoxy-Hb and oxy-Hb permit the activity of Hb concentration at multiple wavelengths by the utilization of sunshine. One wavelength on top of and one below the isosbestic purpose of 810 nm at that deoxy-Hb and oxy-Hb have identical absorption coefficients ar elite. Relative concentration is calculated by brewage lambertz law.So recorded measurements ar because of mirrored lightweight following elliptical pathways by inserting the sunshine electrode and detector ipsilaterally.

Comparing and contrastive alternative neuroimaging devices is a very important issue to require into thought. once comparison and contrastive these devices

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it's necessary to seem at the temporal resolution, abstraction resolution, and also the degree of immobility. medical instrument and Magnetoencephalography have high temporal resolution, however a coffee abstraction resolution. million has lower degree of quality than EEG. gazing EEG,they are similar tofNIR. they need a high degree of quality and temporal resolution, and that they have low abstraction resolution. PET scans and fMRIs ar classified along, but they're clearly totally different from the opposite neuroimaging scans. they need a high degree of immobility, medium/high abstraction resolution, and a coffee temporal resolution. All of those neuroimaging scans have necessary characteristics and ar valuable, but they need distinct characteristics. A special characteristic concerning fNIRS is that it's compatible with a number of the modalities include: MRI, EEG, and MEG.

Stress contributes to sustained feeling of low-energy and depression. Stress causes unskillfulness throughout routine work that makes it a social cause. Chronic stress will negatively have an effect on individuals inflicting anxiety and bipolar disorders. Mental stress may take a toll on our physical health. standard substance demands a personal to be willing to specific himself honestly and lots of United Nations agency want substance might not contemplate it. during this set of circumstances, the study of brain activity and state of brain is crucial that is provided victimisation Electroencephalogram(EEG) signals. standard substance demands a personal to be willing to specific himself honestly and lots of United Nations agency want substance might not contemplate it. during this set of circumstances, the study of brain activity and state of brain is crucial that is provided victimisation electroencephalogram(EEG) signals.

II. LITERATURE SURVEY

A. National Hand Clenching Force and Speed Modulate Brain Activity and square measure Classified by NIRS Combined with graphical record.

NIRS combined with graphical record,imagined is employed for watching the brain activity, further as 6-class classification of those notional motorparameters by NIRS- EEG were explored for the synchronous acquisition of brain activity signals from the sensory excitable area.Near infrared probeswere aligned with C3 and C4, and Between the NIRS probes graphical record electrodes square measure placed. NIRS and graphical record signals were nonheritable

from vi healthy subjects throughout vi notional handclenching force and speed tasks involving the proper hand. Theresults showed that NIRS combined with graphical record is effective forsimultaneously measurement brain activity of the sensorimotor region.The study additionally showed that within the length of (0, 10) s forimagined force and speed of hand clenching, HbO 1st exhibited anegative variation trend, that was followed by a negative peak.After the negative peak, it exhibited a positive variation trendwith a positive peak concerning 6–8 s once termination of imaginedmovement. During (-2, 1) s, the graphical record might have indicated neuralprocessing throughout the preparation, execution, and watching of agiven notional force and speed of hand clenching. Theinstantaneous section, frequency, and amplitude feature of theEEG were calculated by David Hilbert transform; haemoglobinO and thedifference between HbO and Hb concentrations were extracted.The options of NIRS and graphical record were combined to classify three levels of notional force (at 20/50/80 nada MVGF (maximum voluntarygrip force)) and speed (at zero.5/1/2 Hz) of hand clenching by SVM.The average classification accuracy of the NIRS-EEG fusionfeature was zero.74 ± 0.02. These results might give increasedcontrol commands of force and speed for a brain-controlled robotbased on NIRS-EEG.

B. Dry Electrode-Based Fully Isolated EEG/fNIRS Hybrid brain-monitoing system.

A compact cross breed cerebrum observing systemis proposed to perform synchronous 16-channelelectroencephalogram (EEG) and 8-channel functionalnear-infrared spectroscopy (fNIRS) measurements.Architecture-enhanced simple frontend incorporated circuits(Texas Instruments ADS1299 and ADS8688A) were utilized to at the same time accomplish 24-piece EEG goals and solid inertness less (<0.85 μs) bio-optical estimations. Suppressionof the commotion and crosstalk produced by the digitalcircuit segments and blazing NIR light sources was augmented through straight controller based completely confined circuit plan. Gel-less EEG estimations were empowered by utilizing spring- stacked dry cathodes. A few assessments were done by directing an EEG apparition test and a blood vessel impediment explore. An alpha musicality recognition test (eye-shutting task) and a psychological math analyze (aggregate subtraction task) were led to decide if the framework is appropriate to human subject investigations. The assessment results show that the proposed framework is adequately fit for distinguishing microvoltage EEG signals and hemodynamic reactions. The aftereffects of the examinations on human subjects empowered us to check that the proposed framework can distinguish task-related EEG unearthly highlights, for example, eye-shut occasion related synchronization and mental-number-crunching occasion related desynchronization in the alpha and beta mood ranges. An investigation of the fNIRS estimations with a math activity task likewise uncovered a diminishing pattern in oxyhemoglobin fixation.

C. Fusing Near-Infrared Spectroscopy with Wearable Hemodynamic Measurements Improves Classification of Mental Stress.

Human-PC connection (HCI) innovation, and the programmed characterization of an individual's psychological state, are important to different enterprises. Right now, combination of detecting modalities that screen the oxygenation of the human prefrontal cortex (PFC) and cardiovascular physiology was assessed to separate between rest, mental math and N-back memory errands. An adaptable headband to gauge close infrared spectroscopy (NIRS) for measuring PFC oxygenation, and brow photograph plethysmography (PPG) for evaluating fringe cardiovascular movement was structured. Physiological signals, for example, the electrocardiogram (ECG) and seismocardiogram (SCG) were gathered, alongside the estimations acquired utilizing the headband. The arrangement was tried and approved with a sum of 16 human subjects playing out a progression of math and N- back memory errands. Highlights removed were identified with heart and fringe thoughtful action, vasomotor tone, beat wave proliferation, and oxygenation. AI strategies were used to order rest, math, and N-back errands, utilizing forget about one-subject cross approval. Large scale arrived at the midpoint of exactness of 85%, accuracy of 84%, review pace of 83%, and F1 score of 80% were acquired from the order of the three states. Factual investigations regarding the matter based outcomes exhibit that the combination of NIRS and fringe cardiovascular detecting altogether improves the exactness, accuracy, review, and F1 scores, contrasted with utilizing NIRS detecting alone. Additionally, the combination altogether improves the exactness contrasted with fringe cardiovascular detecting alone. The aftereffects of this work can be utilized later on to plan a multi-modular wearable detecting framework for characterizing mental state for applications, for example, intense pressure recognition.

D. Oil-paper insulation using near infrared spectroscopy detection and analytical technique

.

Close to Infrared Spectroscopy (NIRS), as one of investigation innovations, has indicated promisingly mechanical applications for huge properties for late decades, for example, quick reaction, accuracy, non-interruption and so on. Here, the creators utilized NIRS combined with a progression of physical and substance tests to survey the maturing state of oil-paper protection, which is liable for the primary protection sort of high-voltage power transformer. Among these systems, the information scientific calculations are of most extreme significance to decide the assessment exactness. After a lot of experimentation, Savitzky-Golay (S-G) convolution was at last used to de- commotion tests and improve the unearthly information quality. The serious versatile reweighted inspecting (Vehicles) was utilized to choose the ideal wavelength mix of NIRS, which is discovered ready to completely separate the adequately phantom data and diminish measurements of otherworldly

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information. In view of the previously

mentioned systems, the quantitative examination model of NIRS was set up by halfway least squares (PLS), which could artificially process the otherworldly information and the level of polymerisation (DP) of paper tests. The outcomes showed that contrasted and the conventional location strategies, the NIRS examination is a ground- breaking and instructive apparatus to describe the state of oil-paper protection without interruption or harm to transformers.

E. Investigation of Brain Activation with Body Schema Induced by TENS using NIRS.

The body composition is a mind capacity to get a handle on claim body area spatially. At the point when an individual uses apparatuses or controls machines, the body composition is changed unwittingly, and he/she sees these devices or machines as a piece of his/her own body.In this examination, mind enactment adjusting the quality of the body blueprint alteration was explored, and the likelihood to meddle the body pattern by electrical boost was confirmed.A following assignment (in which the member followed characters utilizing own hand with a stick) was structured, and the electrical upgrade was given to the member during the following undertaking. And,cerebral blood stream was estimated utilizing close infrared spectroscopy (NIRS) all the while and was examined. The cerebrum initiation under a few conditions (the quality of the body pattern change and the quality of the electrical boost) was examined utilizing the matched t-test. The outcomes indicated that the substandard parietal lobule and the occipital flap were fundamentally enacted ($t(8) = 1.860$, $p < .05$) if there should be an occurrence of the most grounded body outline alteration condition. Besides the most grounded electrical upgrade had an inclination that it enacted the above cerebrum zones fundamentally ($t(8) = 1.860$, $p < .05$). In result, it was discovered that the body blueprint adjustment could be prompted by the electrical improvement.

TABLE 1: SUMMARY OF LITERATURE SURVEY

Reference Number	Research work	Outcomes
[1]	Implementation of Gel-Less EEG measurement by using spring loaded dry electrode.	Eye closed event related synchronization ,mental-arithmetic desynchronization in beta and alpha rhythm ranges is detected.
[2]	Human-Computer interaction technology conjucated in near infrared technology.	Improved accuracy,Precision,recall and f1scores compared to using of NIRS alone.
[3]	Competitive adaptive reweighted sampling(CARS) was used with NIR combination.	Rapid diagnose of transformers condition and the prediction of DP of the insulating paper.
[4]	fNIR spectroscopy, a non invasive technique is used along with mental arithmetics and Hilbert transform.	Higher classification accuracy of 82.87% And 84.94% are obtained for HBO And HBR.
[5]	Implementation of multi-class brain computer interface to increase the information transfer rate.	As a result information transfer rate of 0.51+0.29 bits /trial is obtained. Which is 1.6 times higher than traditional BCI value.
[6]	Transcranial direct current stimulation and photobiomodulation is used to provide energyby modulating cotical neural activity and hemodynamics.	The image of neuronal excitation and neuronal inhibition is captured by NIRS-EEG joint imaging.It also allow individual dosing of tDCS and photobiomodulation in cerebro vascular disease with a BCI.
[7]	The combination of NIRS and EEG for measuring the brain acivity of the sensorimotor area.	The avaverage classification accuracy of 0.74+0.02.These result provide increased control command of force and speed for NIR-EEG based brain controlled robots.
[8]	Technique of mental arithmetic versus resting state and left versus right hand motor imagnery.	The obtained open access dataset isn used as a reference for a hybrid BCI.
[9]	Qualitative and Quantitative analysis of solid and liquid samples by NIR spectroscopy.	The adulterants in honey such as glucose, sucrose and fructose are determined.
[10]	Transcutaneous electrical nerve stimulation is used to investigate the activation of brain.	Activation of inferioir parietal lobule and occipital lobe $t(8)=1.860, p<0.5$ in case of modification of body schema is obtained.
[11]	Spatiotemporal analysis and wavelet over the equipment of NIR with Ant colony optimization algorithm is perfomed.	Proper optic flow and analysis of emporal domain,spatil distribution of the origin of cortical activity.
[12]	. Enhancement of brain plasticity using NIR spectroscopy as real-time neuro feedback system.	Stimulaion activation of primary motor cortex supplementary motor cortex and prefrontal cortex is achieved.

[13]	Conjuction of BCI and NIR spectroscopy to achieve voluntary self regulatory.	The accuracy of 79+13% is achieved it shows that control via self-regulation was less taxing and more intaitive.
[14]	Simultaneous working of NIRS and EEG.	Idle mode is detected ,which makes the current BCI systems faster and more reliable.
[15]	Implementation of scalp electro-encephalography and intracerebral EEG for invasive monitoring.	Obtained a normalized mean square deviation under 2%

III. PROPOSED SYSTEM

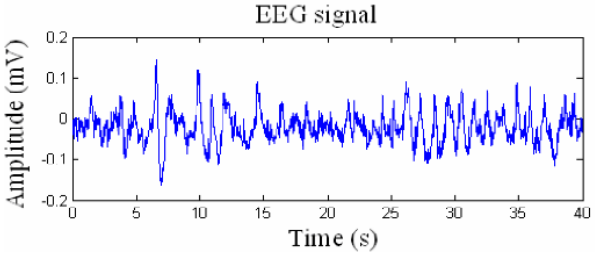
OVER VIEW

The brain functioning varies due to factors such as stress, mental load, sleepiness, fatigue etc. We propose a stress monitoring system based on electroencephalography (EEG) signals enabling individual focused computational approach to produce result of whether a particular individual is stressed or not. The key features extract from EEG signal by fractional dilation wavelet transform.The brain functioning varies due to factors such as stress, mental load, sleepiness, fatigue etc. We propose a stress monitoring system based on electroencephalography (EEG) signals enabling individual focused computational approach to produce result of whether a particular individual is stressed or not. The key features extract from EEG signal by fractional dilation wavelet transform.

EEG SIGNAL

The electroencephalogram (EEG) is a recording of the electrical activity of the brain from the scalp. The recorded waveforms reflect the cortical electrical activity. Signal intensity: EEG activity is quite small, measured in microvolts (mV).

The following figure represents an example of EEG signal



SIGNAL PROCESSING

Signal preprocessing is an electrical engineering subfield that focuses on analysing, modifying and synthesizing signals such as sound, images and biological measurements. Signal processing techniques can be used to improve transmission, storage efficiency and subjective quality and to also emphasize or detect components of interest in a measured signal.The objective of the signal preprocessing in EEG is to eliminate or to attenuate the noise in order to obtain a free-artifacts EEG signal to extract reliable features.

SEGMENTATION

The record of human brain neural activities, namely electroencephalogram (EEG), is known to be nonstationary in general. . In addition, the human head is a non-linear medium for such signals. In many applications.Nonstationarity of the signals can be quantified by measuring some statistics of the signals, such as mean and variance, at different time lags. The signals can be deemed stationary if there is no considerable variation in such statistics. In general, the signals are stationary if their distributions do not vary with time.Often it is necessary to label the electroencephalogram (EEG) signals by segments of similar characteristics that are particularly meaningful to clinicians and for evaluation by neurophysiologists. Within each segment, the signals are considered statistically stationary, usually with similar time or frequency

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distributions.

FRACTIONAL SPLINE WAVELET TRANSFORM

The fractional splines are an extension of the polynomial splines for all fractional degrees $\alpha > -1$. Their basic constituents are piecewise power functions of degree α. One constructs the corresponding B-splines through a localization process similar to the classical one, replacing finite differences by fractional differences. The fractional B- splines share virtually all the properties of the classical B- splines, including the two-scale relation, and can therefore be used to define new wavelet bases with a continuously- varying order parameter. They only lack positivity and compact support.

IV. CONCLUSION

This paper gave the outline view of existing systems and it proves that the EEG is reliable and cheaper than NIRS.Stress contributes to sustained feeling of low-energy and depression. Stress causes inefficiency during routine work which makes it a social cause. Chronic stress can negatively affect people causing anxiety and bipolar disorders. Mental stress can also take a toll on our physical health. Conventional counselling demands an individual to be willing to express himself frankly and many who need counselling may not consider it. In this set of circumstances, the study of brain activity and state of brain is essential which is provided using Electroencephalogram(EEG) signals. Conventional counselling demands an individual to be willing to express himself frankly and many who need counselling may not consider it. In this set of circumstances, the study of brain activity and state of brain is essential which is provided using electroencephalogram(EEG) signals.

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TITLE

AN EFFECTIVE TRANSPORTATION SYSTEM BY CONTROLLING TRAFFIC USING VIDEO PROCESSING

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ABSTRACT:

Laptop vision techniques square measure used for analysis of traffic police investigation videos that is gaining a lot of importance. This analysis of videos is helpful for public safety and for traffic management. In recent time, there has been Associate in nursing exaggerated scope for analysis of traffic activity mechanically. Laptop based mostly police investigation algorithms and systems square measure won't to extract info from the videos that is additionally known as as Video analytics. The method of distinguishing instances of planet objects is understood as object detection. It detects the quantity of vehicles on every road and betting on the vehicles load on every road, this technique assigns optimized quantity of waiting time (red signal light) and period (green signal light). This technique could be a totally machine- driven system that may replace the traditional pre- determined fixed-time based mostly traffic system with a dynamically managed traffic system

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Keywords: Object detection, video analysis, bounding box, holes filling, KNN classifier.

I. INTRODUCTION

Every individual in homes have their own transportation vehicle for sort of functions. In the current context of smart city, specifically within the industrial and market zones, the traffic state of affairs is extremely full most of the time significantly at the height time of business hours. Due to increasing growth of population and vehicles in smart and metropolitan cities people face ton of draw back at the key traffic points of the business cities. To stay a loof from such severe issues many radiant urban communities are instantly implementing smart management frameworks, that job on the standards of traffic automation with interference of traffic problems.

The fundamental plan lies in assortment of holdup information quickly and payment the alternate strategy to vehicles what is more as passengers, with on-line traffic information system and effectively applying it to specific traffic stream. By exploitation the thing detection methodology the vehicles square measure detected and that they square measure counted for the density in several lanes. Prioritizing the density in drizzling order the lanes square measure turned inexperienced for a particular amount of your time, following them is that the another lane that stands next within the priority. So the traffic will be controlled mechanically exploitation the trendy digital pictures or frames.

II. LITERATURE SURVEY

There are square measure several literatures work on the market on intelligent transportation System (ITS). The Intelligent transportation System (ITS) provides services associated with completely different modes of transport associate degreed traffic management systems with an integration of control centers. Video-Based investigationfor traffic investigation has been a major section of ITS. The traffic police investigation in urban surroundings became tougher compared to the highway thanks to numerous factors like camera placement, littered background, cause variation, object occlusion and illumination changes.[1] The background subtraction technique is employed to seek out foreground objects. To sight the moving vehicles, thresholding, hole filling and adaptative morphology the square measure is applied. The vehicles were detected and counted with their virtual detection zone. However the disadvantage is that the virtual detection zone should be massive. For shadow detection and shadow removal masking techniques is enforced. [2]
Later the vehicles square measure known exploitation MSER feature detection, wherever correspondences between image parts from 2 pictures with different viewpoints. Feature matching compares one feature of image to a different image to sight of a vehicle. In future generalization of car should be taken under consideration. [3]
To overcome this cagy edge detection methodology is applied wherever the

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sides square measure detected and therefore the image is born-again into binary image. Here the white pixels square measure calculated and compared with reference image. The matching proportion is calculated during which the matching proportion is directly proportional to the time delay.[4] Later background subtraction is completed by mathematician Mixture model (GMM) wherever the vehicles square

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measure detected by blob analysis. Vehicles square measure counted by incrementing counter by bounding box for vehicle. The disadvantage is that this methodology fails to removes the shadow and occlusion in input video.[5].

Author Sedakul combined the work of background subtraction and blob analysis to spot the article. [6] Haar feature based mostly cascaded Adaboost classifier has been planned for face detection. YOLO (You solely look once) treats detection method as a regression downside to map the image in to object bounding boxes. In this, the input pictures divides in to grids, and every grid on place the bounding boxes on image. [7]

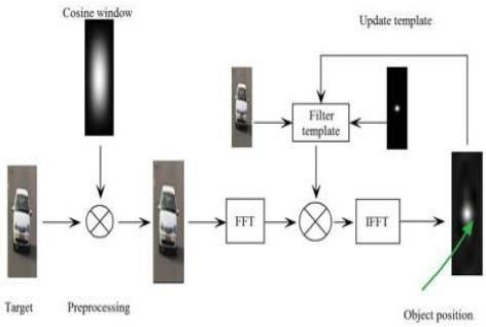

Fig.1

III. PROPOSED WORK

The system is meant to spot variety of vehicle on every traffic node with laptop vision. System considers roads going a stoplight as outgoing edge and roads returning towards a stoplight as incoming edge. By considering variety of waiting cars on road is might investigation supported the segmentation method. Then mark the cars victimization Bounding box for count to open the signal supported cars count. In our planned system, use of HSV plane separation to urge feature of every vehicle to form the dataset. Then, we've got to use KNN classifier algorithmic rule for classification. It'll offer precise the classification of every vehicle with exact result. The advantage is that we tend to get actual results of seed and weed, HSV feature offers additional correct result. It is User friendly and easy method. Time delay can scale back.

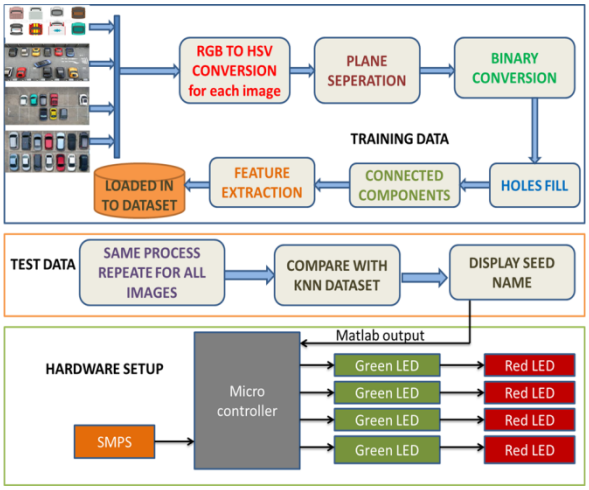

Fig.2

IV. WORKING

In this the traffic videos area unit given as inputs that is then reborn into frames for more process .The frames area unit then reborn into HSV(Hue-saturation value) pictures during which the planes area unit separated. We have a tendency to take into account the saturation plane for binary conversion because it contains most of the data scrutiny of the 3 planes. The binary conversion is completed by fixing a threshold worth, during which below threshold is taken as 0(Black) and on top as one(White). To get a correct image of a vehicle the holes area unit crammed by KNN(K-Nearer neighbor) classifier. Finally the bounding box is created and therefore the vehicle count has been taken. This method is applied for all the four lanes and therefore the density is measured in line with the priority the signals area unit modified in decreasing order severally. Then the mat workplace output is given to the hardware and verified.

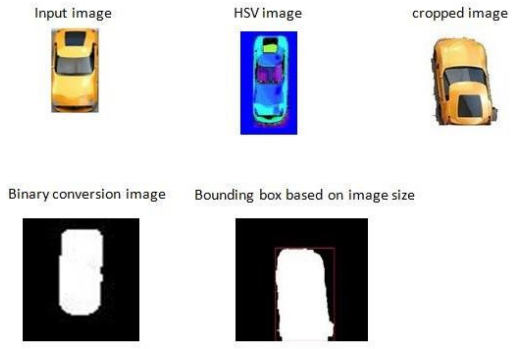

Fig.3

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V. HARDWARE IMPLEMENTATION

Peripheral Interface Controller (PIC) is microcontroller developed by a silicon chip, PIC microcontroller is quick and straightforward to implement the program once we contrast different microcontrollers like 8051. The benefit of programming and straightforward to interfacing with different peripherals PIC become triple-
crown microcontroller.PIC principally created of Harvard design and additionally supports reduced instruction set computing (Reduced Instruction Set Computer), thus it is quicker than different microcontrollers. It works at 5V DC. Here we have a tendency to use PIC16f883 for implementation of traffic signals.

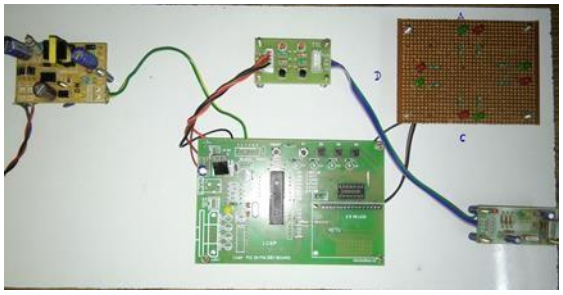
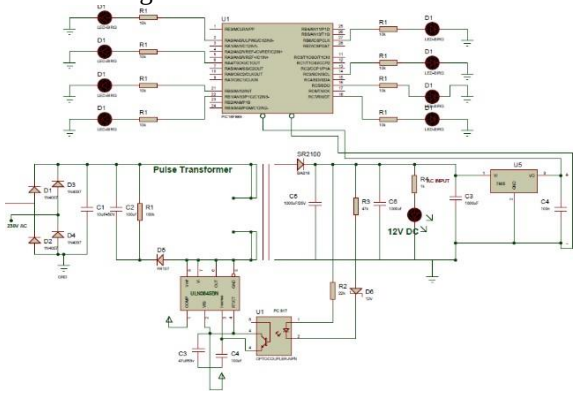


Fig.4

The SMPS (switched mode power supply) is employed to convert the High voltage AC into low DC voltage. The electrical device in SMPS step downs the AC voltage. TTL (Transistor-transistor logic) communicates between totally different voltages by equalizing them. UART named CH34 is employed for serial communication between the software system and also the hardware. The ultimate results square measure additional verified through LED's.



VI. RESULTS

Case 1:

In case 1 we consider four lanes of traffic with various vehicles. According to the density of vehicles the traffic signals are varied with specific time delay. Comparing the four lanes B lane has more number of vehicles. Hence it has been considered as first priority. Later the other lane

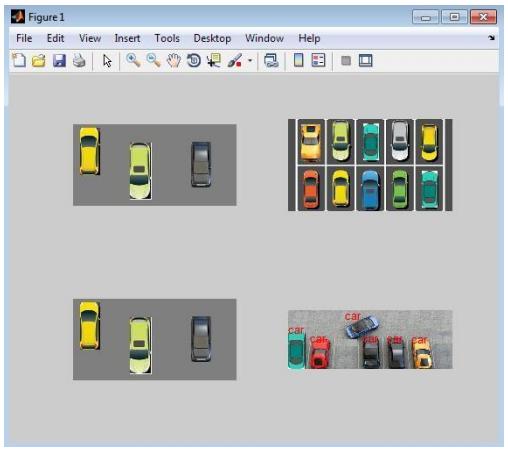


Fig.5

Fig.6

Case 2:

In case 2 we have a tendency to take into account four lanes of traffic with varied vehicles as well as automobile. The lane having automobile is given as 1st priority. Later in line with the density of vehicles the traffic signals are varied with specific time delay. Comparison of the four lanes, automobile is gift in lane A. Hence it has been thought as 1st priority. Later the opposite lane traffics are discharged in line with their density.

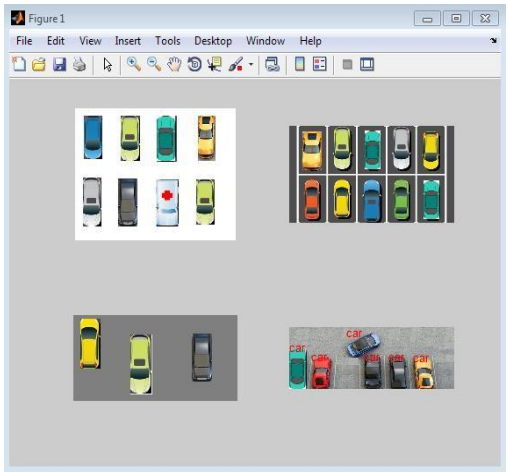


Fig.7

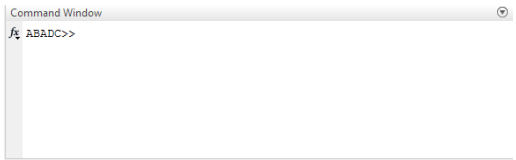


Fig.8

VII. CONCLUSION

The main advantage of this project is four lanes are taken into thought. We are going to get precise results of seed and weed, HSV feature offers additional correct result. It's User friendly, easy method and time delay are reduced. During this a way for estimating the traffic and to order the lanes in stoplight victimization Image process is conferr ed. It additionally detects the presence of machine and offers 1st priority to permit it. This is often done by victimization the camera pictures captured in every lane. Every image is processed on an individual basis and therefore the range of vehicles has been counted for every lane. Supported the amount of vehicles, mechanically the lane with high congestion are allowed 1st to maneuver. PIC microcontroller is additionally interfaced to demonstrate this method.

Of this new technique embrace such benefits as use of image process over sensors, low cost, simple setup and comparatively sensible accuracy and speed. As a result of this technique has been enforced victimization Image process and Mat science laboratory software package, production prices are low whereas achieving high speed and accuracy.

Thus, it is enforced in metropolitan town wherever there's significant traf fic at some stage in the day.

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TITLE

ARUDINO BASED AUTONOMOUS WATER QUALITY MONITORING GADGETRY

AUTHORS

Maninathan D, Muthamil R, Naveenkumar S, Pelleti Harshavardhan, Aiswarya V

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ABSTRACT:

Water being a universal solvent faces extreme variations in its quality at diverse places depending on the condition of its source and the treatment it receives. The quality of this holy source is bound to meet Environmental Protection Agency (E.P.A) standards. Periodical analysis of the quality of water should be routinely executed to maintain and monitor its purity. Turbidity, Temperature and pH are the most prominent parameters that define water's quality and the existing mode of challenging these parameters has always been manual collection of samples and sending them over to laboratory for water quality check, which procrastinates the process by a few days. The proposed system ensures to provide a real-time, on-spot and speedy and effective water quality analysis by automatically monitoring the turbidity, Temperature and pH of water through sensors and intimates the remote user of even the slightest change in the quality. All the existing systems had aimed to cover a small area but the proposed work not only automates the entire process but also focuses on covering wider boundaries and larger perimeters and is hugely economical too.

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Arduino Based Autonomous Water Quality Monitoring Gadgetry

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INTRODUCTION

Any resource over utilized will lead to hazardous aftermath and water defilement is one such impacts that the planet is facing currently. Some of the manually and regularly monitored parameters are pH, turbidity, dissolved oxygen, chemical oxygen demand, biochemical oxygen demand, ammonia nitrogen, nitrate, nitrite, phosphate, various metal ions. This conventional method comes with the limitations of the manual sample collection, long-time analysis, demonstration equipment aging and many more. Usage of sensors prove to be an ideal solution to these aforementioned limitations as it readily converts a no-power information into an electrical pulse and this work involves implementation of this coming-of-age minute device to solve issues concerning water quality.

RELATED KNOWLEDGE

Today many different forms of water quality monitoring devices are being used but the complexity and compactness of the system is interrogate able. According to the survey, various authors proposed different methodology to obtain the data efficiently. Several monitoring devices involved expensive elements and degradable. Based on Paul Duffy Gerry woods James Walsh Michale Kane [8] suggested Monitoring and control of swimming pool through LABVIEW and Compact Rio embedded controller and measured various parameters.

Irina-Elena & Dănuţ-Ionel [12] gives very simplified method of data acquisition of water parameter through personal computer which measures and stores the data effectively. This framework is of fixed type. Mingfei Zhang, Daoliang Li Lianzhi Wang, Daokun Ma & Qisheng Ding [13] used Wireless sensor network to collect data and system characteristics. This framework proved to be smart and intelligent network which works efficiently. Jayti bhat & Jignesh Patoliya [11] used IOT method for monitoring Water quality parameters. Raspberry pi controller is used with ZigBee protocol. Sensors data can be view on internet browser. From the knowledge gained from the survey of concepts from several authors made us to implement the most efficient, effective and economical model or device for water quality monitoring.

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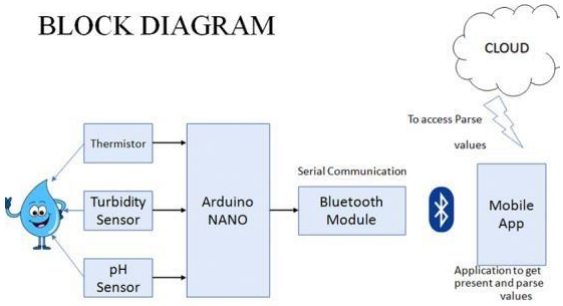
PROPOSED METHODOLOGY

In order to continuously monitoring the water, different sensors will be used to measure the parameters such as temperature, pH and turbidity. These sensors correlate the values and gives to the Arduino board and with the help of Bluetooth module the data will be shared to the smart phone and as well as cloud storage. Parameters will be given to the smart phone via mobile application, message will be sent to Smartphone through Bluetooth module. Thus, smartphone will act as a display device and the cloud storage can also be accessed with the help of the mobile application.

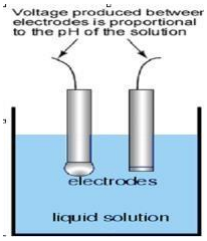
SYSTEM OVERVIEW

The basic system of water quality monitoring is shown in the block diagram below. An android mobile application to access the cloud and to monitor the parameters is the creative idea in this system. Arduino and Bluetooth Module is used to allow real time monitoring



With the help of the mobile application the data fetched through the sensors such as temperature, turbidity, and pH which is displayed to the mobile application display. Similarly, the mobile application has another option which is used to get the values that is previously fetched with the help of cloud storage. The parse values that are fetched are saved in the cloud sheet and accessing of the sheet doesn't require the Bluetooth to be connected with the module or other mobile system.

pH SENSOR: The pH of water is an important parameter to monitor because high and low pH levels can have dangerous effects on human health. The pH of a solution can ranges from 0 to 14.A pH sensor has measuring electrode and a reference electrode. A battery positive terminal connected to the measuring electrode and negative terminal to the reference electrode. The reference electrode provides fixed potential and when pH sensor immersed in the solution, the reference electrode does not change with changing hydrogen ion concentration. The measuring electrode sensitive to hydrogen ion develops a potential directly related to the hydrogen ion concentration of the solution. The differential voltage of electrodes changes with the temperature, so a temperature sensor is also necessary to correct the change in voltage. The design and operational theory of pH electrodes is a very complex subject, explored only briefly here.



TURBIDITY SENSOR: Turbidity is the quantitative measure of suspended particles in a fluid. It can be soil in water or chocolate flakes in your favorite milk shake. Keeping aside the portable purposes, there are several industrial and household solutions that make use of water in some or other manner - for instance, a car uses water to clean the windshield, a power plant needs it to cool the reactors, washing machines and dish washers depend on water like fish. Water flows between the two projections of the transparent plastic can. These projections house the photo transistor and the photo diode respectively. The photo transistor emits light rays that are supposed to reach the photo diode.

These light rays come across the water flow and lose their path when they meet any suspended particle in the water. As a result, the light received at the photo diode is less in

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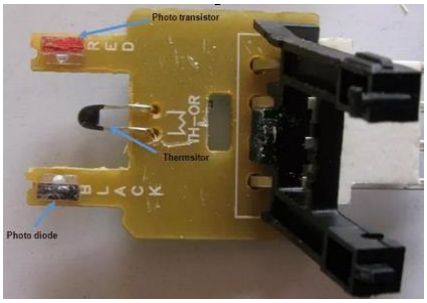
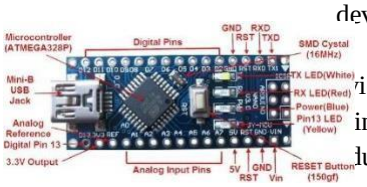
amplitude when compared to that when it was emitted. This difference in amount of light sent and received is conveyed to the micro controller operating the sensor and decisions are taken in accordance to that.



TEMPERATURE SENSOR: A temperature sensor is a device, usually an RTD (resistance temperature detector) or a thermocouple, that collects the data about temperature from a particular source and converts the data into understandable form for a device or an observer. Temperature sensors are used in many applications like HV and AC system environmental controls, food processing units, medical devices, chemical handling and automotive under the hood monitoring and controlling systems, etc.

The sensor is good up to 125°C the cable is jacketed in PVC so we suggest keeping it under 100°C. Because they are digital, you don't get any signal degradation even over long distances! The DS18B20 provides 9 to 12-bit (configurable) temperature readings over a 1-Wire interface, so that only one wire (and ground) needs to be connected from a central microprocessor. Usable with 3.0-5.5V systems.

An **ARDUINO NANO** is a single board microcontroller based on the Atmega328. It is open source hardware- software used for development electronic ices and its interfacing. duino uses SRAM memory with flash and EEPROM storage technology. It is a 30-pin device operating at 5volts supply.



A **BLUETOOTH MODULE**, A HC-06 wireless Bluetooth transceiver RF main module serial for Arduino is used to transmit and receive serial data elessly over the ne. This module is d for establishing eless Bluetooth nection between devices.

Fig 3: Bluetooth Module

CONCLUSION AND FUTURE WORK

The prototype developed for water quality monitoring is very beneficial for safeguarding public health and also adds to maintain clean environment. The automation of this water monitoring, cleaning and control process removes the need of manual labor and thus Saves time and money. The automation of the system makes the monitoring process more efficient and effective. Real time monitoring on mobile phone which is possible with the help of mobile application with Arduino and Bluetooth module allows remote controlling of the system. The future scope of this project is monitoring and as well as controlling under some environmental conditions like drinking water quality, industry inlet and outlets, disinfection of waste water etc. This system could also be implemented in various industrial processes. The system can be modified according to the needs of the user and can be implemented along with lab view to monitor data on computer.

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TITLE
Power Control of Doubly Fed Induction Generator Using DPC Method

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ABSTRACT:

In this paper, the power control of doubly fed induction generator (DFIG) used in wind power conversion system is done by a method called direct power control method. In this designed system, the rotor voltage of DFIG are controlled based on active and reactive power at each switching period. An experimental test bed has been established in order to test the proposed control method. This experimental setup consist of a DFIG, induction motor with a variable speed driver and a bidirectional back to back converter marked with rotor side control (RSC) and grid side control (GSC). In order to control the system a TMS320F2812 microcontroller is also used. The proposed control algorithm is done using MATLAB and SIMULINK program. The outcome of the experiment shows that stator's active and reactive power of DFIG successfully follow the reference active and reactive power value under different operating condition such as for different speed of rotor and active and reactive powers. It is concluded that harmonic disorders of stator current are under the behavior of proposed control algorithm

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Power Control of Doubly Fed Induction Generator Using DPC Method

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Abstract— In this paper, the power control of doubly fed induction generator (DFIG) used in wind power conversion system is done by a method called direct power control method. In this designed system, the rotor voltage of DFIG are controlled based on active and reactive power at each switching period. An experimental test bed has been established in order to test the proposed control method. This experimental setup consist of a DFIG, induction motor with a variable speed driver and a bidirectional back to back converter marked with rotor side control (RSC) and grid side control (GSC). In order to control the system a TMS320F2812 microcontroller is also used. The proposed control algorithm is done using MATLAB and SIMULINK program. The outcome of the experiment shows that stator's active and reactive power of DFIG successfully follow the reference active and reactive power value under different operating condition such as for different speed of rotor and active and reactive powers. It is concluded that harmonic disorders of stator current are under the behavior of proposed control algorithm.

Keywords-doubly fed induction generator, direct power control, wind energy conversion

I. INTRODUCTION

Doubly fed induction generator (DFIG) is suitable choice for variable speed wind turbines. Due to the fact that the DFIG is controlled by the rotor circuit and the rotor circuit power approximately equal to 30% of the stator circuit power, DFIG need small-scale power electronic converter when compared with induction generators or synchronous generators. Therefore usage of the DFIG in variable speed wind turbine systems are more efficient [1].

DFIGs stator windings directly connected to the grid and rotor windings connected to the grid via a bi-directional back- to-back converter as shown in Fig. 1. The bi-directional back- to-back converter consists of two converters called rotor-side converter (RSC) and grid-side converter (GSC). These two converters are connected to a common DC bus.

The rotor side converter is used to control the active and reactive power of the DFIG and controls the power factor of the DFIG. On the other hand grid side converter keeps the DC bus voltage constant. During the operations

between sub synchronous and super synchronous speed ranges, three phase voltage source converter has to be used as GSC. If DFIG will operate only a sub synchronous speed ranges, the GSC might be replaced with a three-phase uncontrolled rectifier [2].

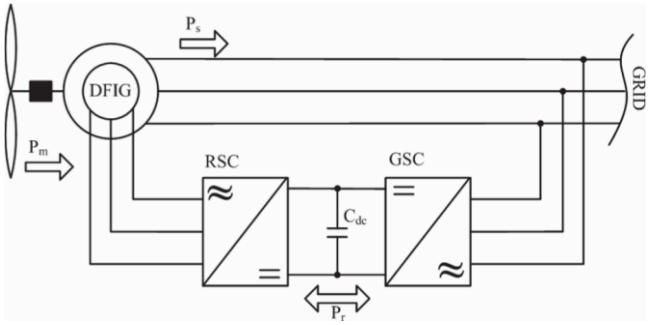

Figure 1. DFIG system with a back-to-back converter

Control of the DFIG is more difficult than the control of the other generator types. A lot of studies about control of DFIG are found in literature. Some of examples are direct power control, scalar control, field oriented control, fuzzy control and others [3-6]. Although these control techniques can be used conjunction with others as well as standalone, most of the studies have been used vector control technique because of enabling active and reactive power control of DFIG independently [7].

In this study a direct power control technique for grid connection of the DFIG in wind generation system has been suggested. In the system the vector control technique and direct power control technique are used together for control of rotor side converter. In the proposed system required rotor control voltages are calculated directly at each switching period, based on the

II. PROPOSED DPC ALGORITHM

The block diagram of the proposed direct power control (DPC) technique, applied to the Rotor Side Converter (RSC), is depicted in Fig. 4. In order to implement DPC grid and stator voltages (vga, vgb, vgc), (vsa, vsb, vsc), stator and rotor currents,

(isa, isb, isc), (ira, irb, irc) and rotor positi(θ_g) are measured. Since a rotating reference axis in d-q frame, oriented with stator flux, is employed for control of the DFIG, all measured voltage and current signals are converted to (α-β) and (d-q) reference frame (α-β)

active and reactive powers. In order to test proposed control technique, an experimental test bed has been established. The experimental test bed consists of a DFIG, an induction motor with variable speed driver and a bi- directional back-to-back converter. Control algorithm of the

system has been embedded into TMS320F2812

microcontroller. The experimental results show that the DFIGs stator active and reactive powers follow successfully the reference active and reactive power values under different operating conditions. Furthermore, experimental results show that the total harmonic distortion of stator currents stays in the boundaries of the standards.

axes currents independently and widely used in motor drives [8,9].

$$\begin{bmatrix} f_\alpha \\ f_\beta \end{bmatrix} = \frac{2}{3}\begin{bmatrix} 1 & -\frac{1}{2} & -\frac{1}{2} \\ 0 & \frac{\sqrt{3}}{2} & -\frac{\sqrt{3}}{2} \end{bmatrix}\begin{bmatrix} f_a \\ f_b \\ f_c \end{bmatrix} \quad (8)$$

$$\begin{bmatrix} f_d \\ f_q \end{bmatrix} = \begin{bmatrix} Cos\theta & Sin\theta \\ -Sin\theta & Cos\theta \end{bmatrix}\begin{bmatrix} f_\alpha \\ f_\beta \end{bmatrix} \quad (9)$$

respectively. As construction of the control algorithm, the measured values are converted firstly to frame by using Eq. 8 and then transferred to (d-q) frame with the help of Eq. 9. In this way the rotor flux transferred into the d-axis. This method allows the optimal control of both d and q Where *f* denotes either voltage or current values

and represents grid voltage position or DFIG's slip position. θ

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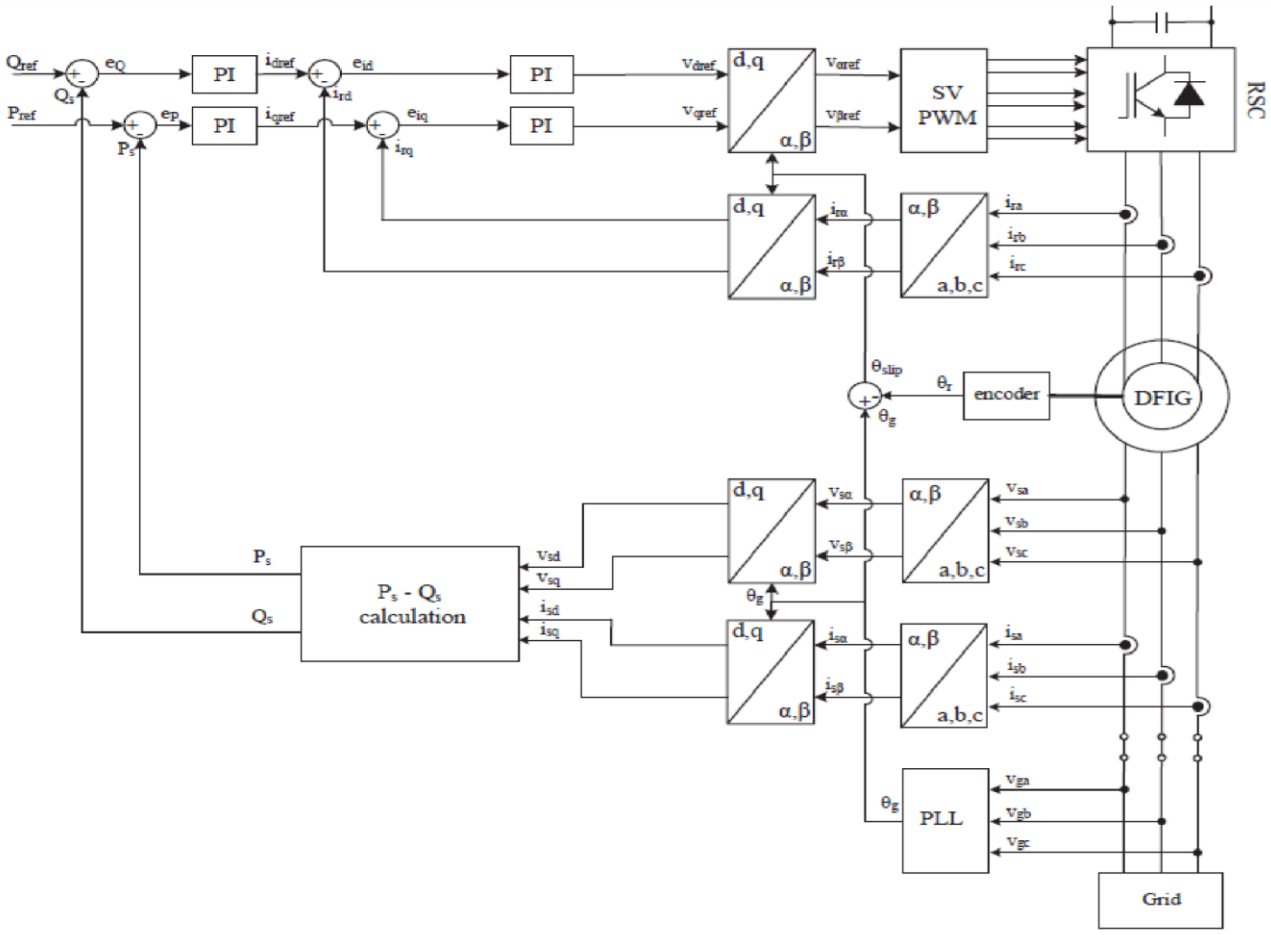

Figure 4. Proposed direct power control (DPC) technique block diagram

Grid voltage positor(θ_g) obtained from the phase-locked loop grid voltage position and DFIG's rotor posit(θ_g-θ_r) and (PLL) structure and used for active and reactive power used to control algorithm for RSC. calculation algorithm. Slip positic(θ_{slip}) is differencebetween

In order to complete controlling process transformation of current or voltages from (d-q) axis to (a-þ) axis is also necessary during and/or after control action. This conversion can be obtained by applying the inverse Park transformation as

given at Eq. 10.

$$\begin{bmatrix} f_\alpha \\ f_\beta \end{bmatrix} = \begin{bmatrix} Cos\theta_{slip} & -Sin\theta_{slip} \\ Sin\theta_{slip} & Cos\theta_{slip} \end{bmatrix} \begin{bmatrix} f_d \\ f_q \end{bmatrix} \quad (10)$$

Control action of the system can be described as follows: The power errors between reference and calculated active and reactive powers are compensated by left hand side PI controllers and reference currents in d-q reference frame i_{dref}, i_{qref} are obtained. These currents and then compared with the

measured DFIG's rotor currents and current errors are

produced. The current errors are regulated by right hand side PI controller and voltage references in d-q frame v_{dref}, v_{qref}, are acquired. The voltage signals (v_{qref}, v_{dref}) are converted to a-þ-

axis components (v_{aref}, $v_{þref}$) by using the inverse park transformation matrix. These a-þ axis components (v_{aref}, $v_{þref}$) are applied to space vector PWM block to obtain switching signals for RSC. The RSC converts DC power to AC power based on the switching signals coming from space vector PWM.

III. EXPERIMENTS

A. Experimental Rig

The block diagram of the experimental test rig is shown in Fig. 5. As shown in the block diagram, the experimental test rig consists of DFIG, induction motor, bi-directional back-to- back converter, handmade measurement board, three phase transformer and microcontroller. The induction motor which is controlled by Micromaster 440 motor driver is used to emulate the wind turbine The DFIG and the squirrel cage induction motor parameters are given in appendix. An incremental encoder has been used to detect rotor position angle of the DFIG.

DFIG's rotor while the VSC at the grid side connected to the grid via a three phase transformer to match voltages between DFG and grid. DC bus voltage value is fixed at 120 V during the experimental studies.

A hand-made board has been designed for measuring

voltage and current signals of DFIG and grid. The board consists of seven voltage sensors (LEM LV 25P) and six

current sensors (LEM LA 100P) and converts high-amplitude voltage and current signals to small amplitude voltage signals.

Finally, TMS320F2812 microcontroller has been employed to handle control algorithm for the system. The TMS320F2812 microcontroller is a powerful choice for power electronic and electric machines control. Because, it has 150 MHz operation frequency, twelve PWM channel and twelve analog to digital converter input. The fast conversion period, which is about 80 ns, is very suitable for real time sampling. The operation speed and the advanced features of this microcontroller make it an excellent choice for the control of the DFIG.

B. Experimental Studies

Operation of the system has been tested with several experimental studies. During the experimental studies Fluke- 434 power quality analyzer has been used for some

measurements such as stator active and reactive power, current harmonics, stator power factor, etc.

Initially the dynamic response of the proposed DPC strategy has been tested under various active power references. Fig. 6 shows the reference and measured active power of DFIG during grid connection. As seen from the figure, the measured active power catch the reference power in a few seconds and follows it successfully during the operation.

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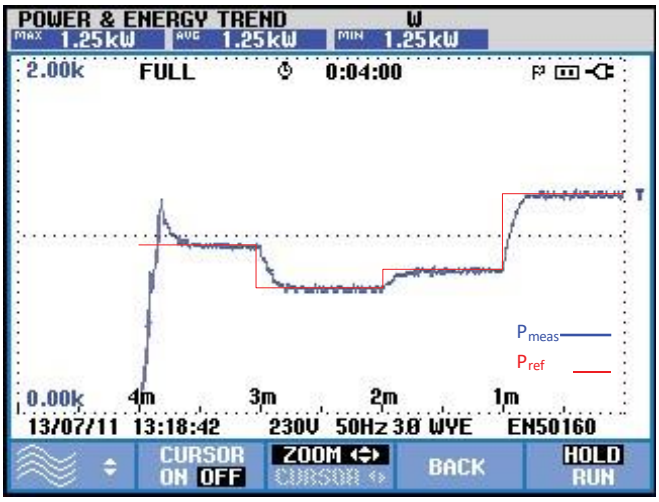

Figure 6. Experimental result under various stator active power

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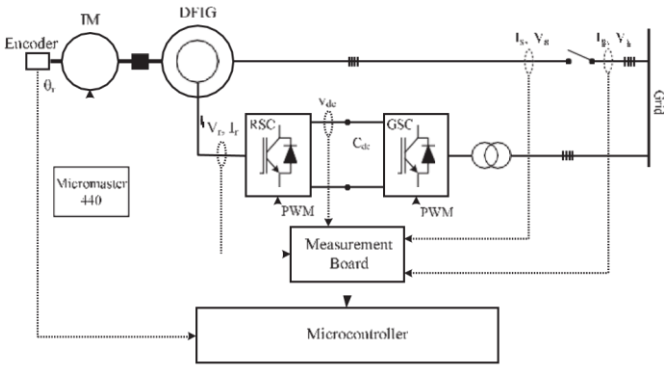

Figure 5. The hardware architecture of the test rig

Three phase bi-directional back-to-back converter has been used for power control of DFIG. This converter consists oftwo voltage source converters (VSC) connected to each other with DC link. The VSCs have been created using six IGBTs

(insulated gate bipolar transistor) and each has 10 kVA power ratings. The VSC at the rotor side directly connected to the

In order to test the tracking performance of the proposed control algorithm for reactive power the second experimental study has been carried out. During the experimental study, the stator reactive power reference value has been set to zero. By the way, unity power factor operation of the generator is intended. Fig. 7 shows the reference and measured reactive power during grid connected operation of the DFIG. As seen from the Fig. 7, stator reactive power tracking the reference reactive power successfully. Also, Fig. 8 shows that, the

generatoroperatingatunitypowerfactorwithproposedcontrol algorithm.

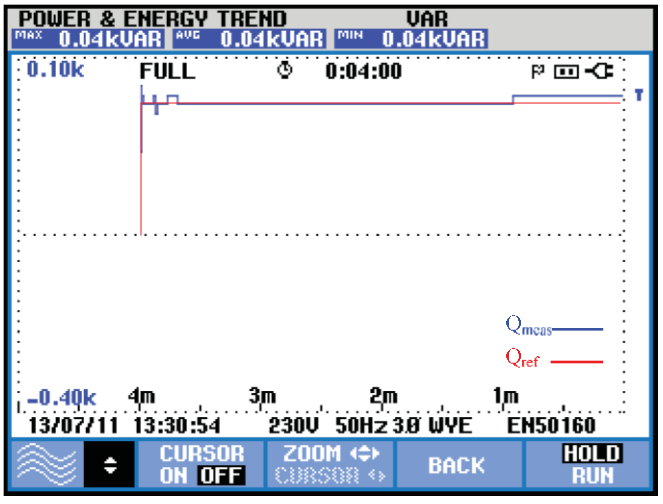

Figure 7. Experimental result stator reactive power

The harmonics table of the stator currents under the proposed control algorithm is shown in Fig. 9. When the figure is analyzed, it can be seen that total harmonic distortion (THD) value of stator currents of the DFIG is between the boundaries values (%2.8≤%5) set by the international standards (IEEE- 519, EN-61000-3-2).

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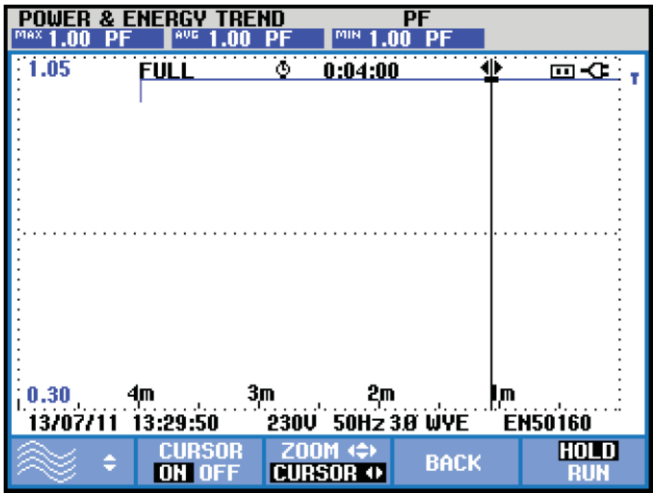

Figure 8. Experimental result stator power factor

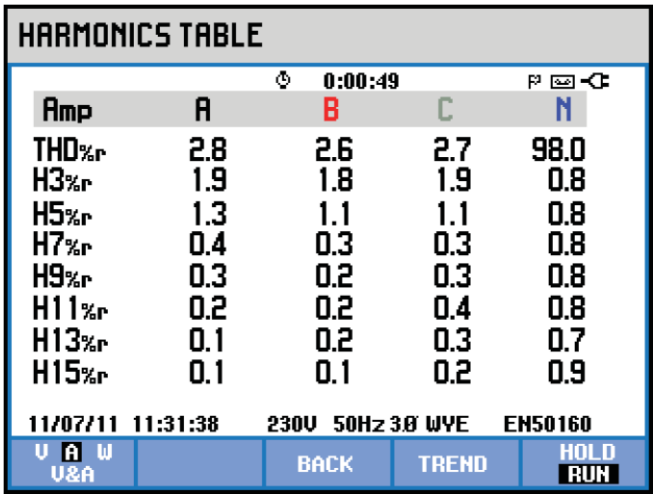

Figure 9. Experimental result stator currents harmonics

IV. Conclusion

This paper presents a direct power control (DPC)algorithm for grid connection of a doubly fed induction generator(DFIG) in wind generation system. In order to test the proposed control technique, an experimental test bed has been established. The experimental test bed consists of a DFIG, induction machine, variable speed driver and a bi-directional back-to-back converter. Also, TMS320F2812 microcontroller has been used to control the system. The proposed control algorithm has been prepared with the help of Matlab&Simulink program.

The experimental results show that the DFIGs stator active and reactive powers can follow successfully the reference active and reactive power values under different operating conditions, such as different active and reactive powers. Furthermore, experimental results show that the total harmonic distortion of stator currents stays in the boundaries of the standards by proposed control algorithm.

V. Acknowledgment

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TITLE
MONITORING OF INFANT SAFETY AND SECURITY USING GSM AND FACE RECOGNITION DEVICES

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ABSTRACT:

Children and women are facing many security problems nowadays. So in such cases they feel handicap and need help to protect them. This paper suggests a new technology for a child safety with one touch system using GSM. Here we introduce a device which ensures the protection of child. The problems we have overcome here using Arduino UNO, Heart beat sensor, Temperature ,GSM , buzzer ,motor and camera .In such case Heart beat Sensor track the pulse rate and temperature sensor used sense the temperature rate for respective child & sends emergency message using GSM .The system proven that it is providing complete security to kids wherever we are using it .In this proposed system the camera is used to detect the unauthorized person .

Keywords—face recognition , camera ,Arduino uno ,heart beat sensor ,temperature sensor ,GSM sim900 ,buzzer ,dc motor ,embedded c , ardeini IDE

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Monitoring of Infant Safety and security using GSM and Face recognition devices

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[1,2]Department of Electronics and Communication Engineering

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Abstract: **Children and women are facing many security problems nowadays. So in such cases they feel handicap and need help to protect them. This paper suggests a new technology for a child safety with one touch system using GSM. Here we introduce a device which ensures the protection of child. The problems we have overcome here using Arduino UNO, Heart beat sensor, Temperature ,GSM , buzzer ,motor and camera .In such case Heart beat Sensor track the pulse rate and temperature sensor used sense the temperature rate for respective child & sends emergency message using GSM .The system proven that it is providing complete security to kids wherever we are using it .In this proposed system the camera is used to detect the unauthorized person .**

Keywords—face recognition , camera ,Arduino uno ,heart beat sensor ,temperature sensor ,GSM sim900 ,buzzer ,dc motor ,embedded c , ardeini IDE

I.Introduction

Babies are one of the most vulnerable patients in a hospital. Ensuring infant security is critical to not only the reputation of the hospital, but also to the peace of mind of everyone there, from nursing staff to new moms. The most effective infant protection solution provides accurate newborn location information along with 24/7 abduction attempt alerts.The best step a healthcare facility can take for newborns and their families is integrating a state-of-the-art baby tracking system. Monitoring infant is the preferred solution for today's busiest hospitals because it is a part of the Security Solutions platform, which uniquely combines the industry's most accurate Real-time Location System (RTLS) with a proven infant safety and security system.The leading solution for baby tracking in hospitals is available with Clinical-Grade Locating™ technology for advanced RTLS use cases.RTLS differs from legacy technologies in its combination of a patented second-generation infrared and active radio frequency Identification (RFID) technology. Monitors with long-lasting batteries to transmit a unique room number; any tag in that room will receive the data. The tag then relays the unique room number and its ID to the location server, using the hospital's existing Wi-Fi or wired network. With a system that easily integrates into third-party solutions, hospital staff can access the data in real-time.

II. Literature survey

A. Motion Analysis by Experiment and Simulation for Riding Bicycles with Children

A car is one of the most recognizable vehicle. In the

late years, the vehicle has a great deal of issues, for example, the ozone harming substances brought about via cars, the expense of fuel up, etc. Right now, a bike pulls in considerations again as a no-emanation vehicle. The bike likewise has numerous points of interest, for example, keeping and expanding rider's wellbeing, alleviation of traffic clog and vitality effectiveness. Be that as it may, since the bike is a shaky framework, a specific measure of expertise is expected to perform stable riding. Many investigation on two-wheeled vehicles, for example, bikes and electric motorbikes have been finished. Saguchi has acknowledged stable running on straighttline and bend movements utilizing a model which is viewed as the slip of the wheels. Satou has acknowledged settling a bike to control a handle and focal point of gravity(COG) by an appended truck mass system .The law concerning the wellbeing on the riding bike with two-kids is examinated in July 2008, in Japan. On the off chance that the conditions, for example, solidness, unbending nature, braking qualities and vibration, doesn't ruined when a riding bike with two youngsters ,it is permitted by the law. Notwithstanding, the reasonable numerical models in such case are not indicated yet .In this exploration, so as to think about the dependability of

the bike when riding with little youngsters on a bike and driving, a few investigations are led. Utilizing the results ,to build up a help framework for riding bike with two kids is our last research objective. Right now, trial framework to quantify conditions of a bike is worked so as to commit building up the such framework. A state is examined to build up some wellbeing gauges to the riding bike with two-youngsters when the weight expected as little kids is put on newborn child seats. So as to confirm the outcomes in the numerically, the displaying of the bike on three dimensional space is performed.

B. Application of intelligent agent and rfid technology for

indoor position: safety of kindergarten as example.

This examination consolidates Radio Frequency Identification (RFID) with multi-specialist innovation, it apply to kids' wellbeing of care in kindergarten. It use RFID to position, first, kid care laborer will assist kids with putting on Tag, and peruser get sign to get RSSI, and through the framework to get the youngsters' area. The Tag's information not just incorporate sign, nature of sign, time of arrive at peruser, yet in addition have youngsters' temperature. The message makes care staff to know youngsters' physical condition. Our framework formed by multi-specialist. After specialist convey to choose to send notice or not. In the event that the message isn't right, framework can through client's criticism to self-managed learning. It not just increment preparing proficiency of startling occasion and framework, yet in addition diminishes likelihood of human carelessness. Additionally, the operator's highlights use independence and rationale causes framework to can constant observing and computerized examination to decide the present status. So framework can improve the possibility measures, and make care staff can deal with unforeseen condition quickly and give an ideal kindergarten.

C. Performance Improvement of Hiroshima City Children Tracking System by Correction of Wrong Registrations on School Routes.

Recently, in Japan, crimes against children become

atrocious and brutal. In some cases, children are attacked on the way to and back from school. Many technologies using

ubiquitous networks have been developed to prevent crimes

against children on their way to and back from school. Existing technologies, however, are not powerful to prevent crimes against children and helpful for parents since it is difficult to take information of children as a group. If the system can provide group information of children on the way to and back from school, it is easy for parents to know their safety level. This paper proposes a new technology for Children Tracking System based on mobile ad hoc networks and describes outline of Children Tracking System in Hiroshima City. The field experiments using the Children Tracking System have been performed and the effectiveness of the system is shown by data analysis for the experimental results.

D. Design of Safety Education System for Children Based on Virtual Reality Technology.

According to survey of nation’s related departments, it is shown that accidental injury such as traffic, fire and drowning, is the leading killer of death of children under 14. The primary cause for leading to misfortune was mostly to, because children had little safety knowledge and little ability of protecting themselves. The experts pointed out that it is helps to promote the skills to protecting themselves of children by safety education in where 80 percent of accidental injury can void. Though safety education of children is paid more and more attention by related departments, there are no effective approaches and solutions for safety education of children Due to short funds and technology, teachers always give safety lessons by means of books whose mode is boring and whose content is to be forgotten. How to accept and absorb safety educational knowledge or practice safety training under safe and immersive circumstance. It is a urgent task for teachers who teach safety education. The solution to the problem is to adopt virtual reality technology. Three dimensional scene made by virtual reality technology can provide children with fire-fighting and traffic safety knowledge with immersive feeling. It will certainly achieve excellent teaching effects on experience and grasp several kinds of safety knowledge, as well as skills to protect themselves in vivid virtual environment..

E. Implementation of Children Tracking System on Android Mobile Terminals

Kids Tracking framework is generally utilized everywhere throughout the world to guarantee guardians that their wards are sheltered from suspicious activities and their child is glad in school environment without crying. The proposed framework incorporates following the kid's development to and from school. The data relating to missed youngster is sent to control room of the school just as to their particular guardians, on the off chance that they move past the inclusion region. The data about the youngster's whereabouts as well as whether the kid is crying is sent to guardians through instant message to their Android cell phone. Framework created by Yuichiro MORI, et.al, uses"Autonomous Clustering system" for overseeing bunches ofAndroid terminals appended to youngsters in school. Android terminals have remote LAN and Bluetooth gadget. It receives Bluetooth correspondence among Android versatile terminals in each group to gather data and bunch head conveys the equivalent through labels to server at school utilizing remote LAN. It brings about absence of individual consideration towards the youngsters since the bunch head sends the data about the kids gathering and not about every individual and likewise doesn't focus on kid crying inside the school.

It offers less security . Youngsters following framework is additionally evolved dependent on versatile adhoc systems. Framework created in says that in GPS framework and label based framework, each parent can't acquire bunch data on the region of the kid. Through field tests, it is affirmed that, as long as youngsters strolled at typical speed on the foreordained method to and over from school, the framework could give area and gathering data of kids to their folks. From trial investigation, it is discovered that framework autonomous factors, for example, power deficiency in telephone and performing incorrectly enrollments in Bluetooth labels rule in bringing down normal label acknowledgment rates for school courses. Following framework in emergency clinic condition is performed utilizing incorporated Ultra wideband and GPS advancements for performing productive indoor/outside following. Investigations show that framework may give additional insurance to patients yet frame work depend on WiFi system to transmit information and updation rate is very low because of system jam. It incorporates confused alignment technique just as high set up cost for the UWB sensor arrange .Multihop Clustering plan can be joined for adhoc system and it remembers dynamic change for topology of adhoc systems, overhead for the administration of the system is little and consistently disseminated. It does exclude structure of nonexclusive capacity to assess flexibility of bunching plans The previously mentioned framework roused me to make an endeavor to reconfigure it by including scarcely any highlights and along these lines making it increasingly secure contrasted with the current one

TABLE 1: SUMMARY OF LITERATURE SURVEY

Reference Number	Research work	Outcomes
[1]	Child tracking system using GPS and cellular network.	Wrong registration and location problem, power shortage is resolved.
[2]	Motion analysis of children riding in bicycle.	Stability of bicycle riding with is determined.
[3]	Implementationnn of radio frequency identification with multi agent technology for child safety in kintergarden.	Help care staff to avoid mis judgement and prevent child from missing.
[4]	Implementation Experimental child safety virtual system	It enhance consciousness of protection and icrease their ability.
[5]	Child tracking system on school and home.	Information of children current state is send to parents via message system.

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[6]	Implementaation of GSP/ GSM based arm band for monitoring children activities.	Enhanced safety and security system of child monitoring .
[7]	Infant monitoring system based on wireless sensor network.	Alzheimer's patients can be monitored more accurately.
[8]	RFID based system for school children safety enhancement .	Tag and Gsm system provide parents whether the child is in bus or not.
[9]	Regulatory aspects of child online protection.	It results in protection of minor from online.
[10]	Implementation of child restrained system.	It reduce the case of injury to the children during collision.
[11]	Implementation of integral child safety sytem based on Geo Fencing information.	Monitoring child location and preventing child abuse.
[12]	Cyber safe teenagers system	Internet security is improved to protect childrens and teenagers.
[13]	Building system for child safety.	It result in multiple sensor monitoring of children in various condition.
[14]	Implementation of child montoring based on holding up using IOT.	Croudsourced children detection system.
[15]	Implementation smart school bus.	Real time monitoring of children inside the bus is done.

III.PROPOSED SYSTEM

OVER VIEW

In this work we have introduced GSM module. GSM module will send the message to her relatives and also to the police. So, the relatives and the police can reach to child/women to help her immediately. The system proven that it is providing complete security to kids wherever we are using it.In this proposed system the camera is used to detect the unauthorized person .

ARDUINO UNO

The Arduino Uno is a microcontroller board grounded on the ATmega328 (datasheet). It comprises of 14 digital input/output pins (out of which 6 can be utilized as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a facilitation for USB connectivity, a power jack, an ICSP header, and a reset button. Its designs comprises of assistances that supports the microcontroller in every possible way.

In order to get to work with it one has to simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery. It is accessible in two different versions namely Arduino Uno and Genuino Uno which could be The variations is observed with reference to the region. The Uno is unique from all its former boards in the way that it does not makes use of the FTDI USB-to-serial driver chip.

TEMPERATURE SENSOR

The LM35 series are precision integrated-circuit temperature devices with an output voltage linearly-proportional to the Centigrade temperature.

The LM35 device has an advantage over linear temperature sensors calibrated in Kelvin, as the user is not required to subtract a large constant voltage from the output to obtain convenient Centigrade scaling. The LM35 device does not require any external calibration or trimming to provide typical accuracies The LM35 device has an advantage over linear temperature sensors calibrated in Kelvin, as the user is not required to subtract a large constant voltage from the output to obtain convenient Centigrade scaling.

FRACTIONAL SPLINE WAVELET TRANSFORM

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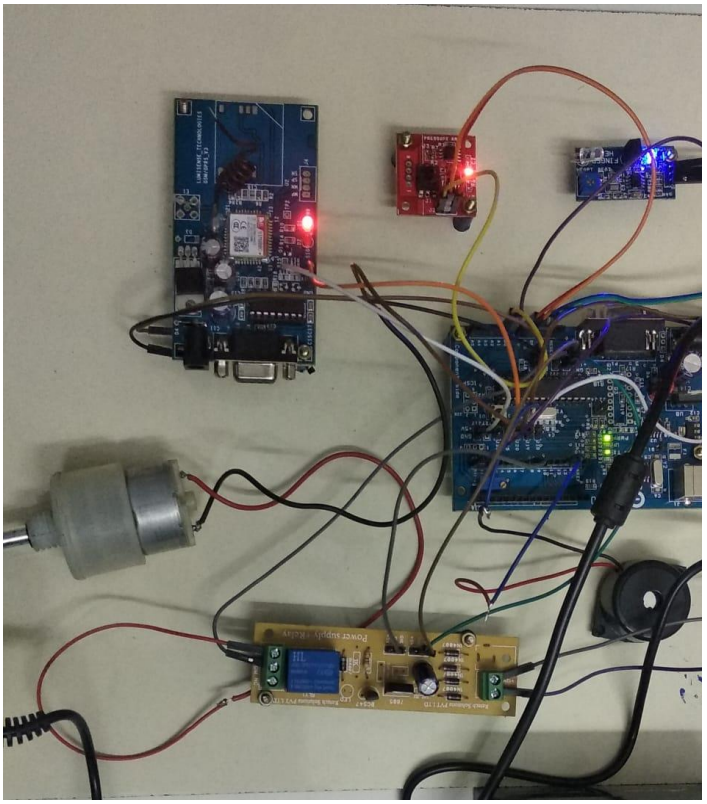
Easy to use low cost motor for robotics application. Nut for mounting motor firmly on body/chassis of robot. Internally threaded hole on shaft for easy mounting of wheels by using screws.A DC motor is any of a class of rotary electrical machines that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current in part of the motor.DC motors were the first form of motor widely used, as they could be powered from existing direct-current lighting power distribution systems. A DC motor's speed can be controlled over a wide range, using either a variable supply voltage or by changing the strength of current in its field windings.

HARDWARE



SOFTWARE

- EMBEDDED C
- ANACONDA NAVIGATOR(PYTHON)

IV.CONCLUSION

Overall, the studies carried out with newborns demonstrated the presence, since birth, of pre-wired domain relevant attentional biases toward faces and the role of experience in shaping the face processing system.As for face detection, here we suggest that faces are not special visual stimuli for newborns and that a specific face-sensitive mechanism is not required to explain face preference since birth. The reviewed evidence speaks in favor of the hypothesis that faces might be preferred at birth because they are a collection of preferred structural (i.e., up-down asymmetry, congruency, etc.) and configural properties that other stimuli may also possess. Consequently, the debate is still open and further studies need to be carried out to disentangle the question about general or specific biases underlying face preference at birth. Further, it seems relevant to investigate whether the activation of the subcortical route in newborns and in adults, putatively active throughout the lifespan (Tomalski et al., 2009), is elicited or not by the same visual stimuli during development and the nature of the interaction between the cortical and subcortical routes in face processing along lifespan.

In addition, future studies are needed on the nature of face representation at birth because we are far from a conclusive answer about the best stimulus that elicits face preference at birth. Some controversial studies about the effect of contrast polarity (Farroni et al., 2005) and the role of the eyes in triggering face preference at birth (see Dupierrix et al., 2014) suggest to further investigate, both with behavioral and neuroimaging studies, what low-level visual cues, such as the high contrast area of the human eyes and the pupil, may render them so important in the first months of life and whether their relevance changes over time.

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TITLE
SMART LANDWIRTSCHAFT

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ABSTRACT:
The proposed system under the smart objective is achieved by the use of various sensors, detectors and display units where the person in charge is notified constantly via GSM, Bluetooth and IoT. The system works under the control of Arduino basis where the different sensors work for each and every aspect consider and thus the proposed system can be productive. Considering the factors of temperature, moisture, presence of gases, humidity, water level in wells, irrigation, quality of air, where all these are detected and further notified to the farmer. This model is proposed with the programming language of C under which all the parameter limits are given, and the message notifications are directly atomized to the farmer's mobile phone via the GSM module, Bluetooth module and IoT module. In order to detect the water level in the well and opening of the gate way to the field, servomotors, pumps, ultrasonic sensors are also used such that flooding can be prevented. Thus, a whole spread smart based agricultural land security can be made productive via this proposed system. It also provides a smart way of farming any particular in agriculture and thus productivity can be achieved under less man power requirement and also increases the safety to the land under cultivation

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Abstract

The proposed system under the smart objective is achieved by the use of various sensors, detectors and display units where the person in charge is notified constantly via GSM, Bluetooth and IoT. The system works under the control of Arduino basis where the different sensors work for each and every aspect consider and thus the proposed system can be productive. Considering the factors of temperature, moisture, presence of gases, humidity, water level in wells, irrigation, quality of air, where all these are detected and further notified to the farmer. This model is proposed with the programming language of C under which all the parameter limits are given, and the message notifications are directly atomized to the farmer's mobile phone via the GSM module, Bluetooth module and IoT module. In order to detect the water level in the well and opening of the gate way to the field, servomotors, pumps, ultrasonic sensors are also used such that flooding can be prevented. Thus, a whole spread smart based agricultural land security can be made productive via this proposed system. It also provides a smart way of farming any particular in agriculture and thus productivity can be achieved under less man power requirement and also increases the safety to the land under cultivation.

Keywords—Smart Agriculture, Water Monitoring, IoT platform, MS (Moisture Sensor), TS (Temperature Sensor), HS(Humidity Sensor), GS (Gas Sensor), Servo System, BT (Bluetooth Module), GSM (Global System for Mobile Communication), Development Board.

I. Introduction

With emerging technologies on automation and smart devices, our country India still lags with its basic production unit for centuries under agriculture. With its rich and fertile land, India can thus produce a widespread quantity on various agricultural products with good quality and the proposed system operates on the various agricultural factors on both physical and chemical aspects. In order to produce smart farming techniques in agriculture, the main factor or base responsible on the same is the soil used for cultivation.The proposed system under the smart objective is achieved by the use of various sensors, detectors and display units where the person in charge is notified constantly via mobile phone. The system works under the control of Arduino bases where the different sensors work for each and every aspect consider and thus the proposed system can productive. Considering

the factors of temperature, moisture, presence of gases, humidity, water level in wells, irrigation, quality of air, where all these are detected and further notified to the farmer. This model is proposed with the programming language of C under which all the parameter limits are given, and the message notifications are directly atomized to the farmer's mobile phone via the GSM module. In order to detect the water level in the well and opening of the gate way to the field, servomotors, pumps, ultrasonic sensors are also used such that flooding can be prevented. Thus, a whole spread smart based agricultural land can be made productive via this proposed system. The proposed system is an integrated proposal from the existing system. The proposed system consists of various other sensors like air quality sensor, PIR sensor, ultrasonic sensor, water level sensor, rain sensor, voltage sensor and other hardware's like Arduino nano and Arduino Uno, solar panel, water pump, Servomotor, GSM module and storage devices like battery.

II. Literature Survey

The scenario of decreasing water tables, drying up of rivers and tanks, unpredictable environment presents an urgent need of proper utilization of water. To cope up with this use of temperature and moisture sensors at suitable locations for monitoring of crops is implemented in the system. An algorithm developed with threshold values of temperature and soil moisture can be programmed into micro controller-based gateway to control water quantity. The system can be powered by Solar panels and can have duplex communication link based on cellular – Internet interface that allow data inspection and irrigation scheduling to be programmed through webpage. The technological development in open source software and hardware make it easy to develop the device which can make better monitoring and wireless sensor network made it possible to use in monitoring and control of greenhouse parameter in precision agriculture.

III. Proposed System

The proposed system is an integrated proposal from the existing system. The proposed system consists of various other sensors like air quality sensor, PIR sensor, ultrasonic sensor, water level sensor, rain sensor, voltage sensor and other hardware's like Arduino nano and Arduino Uno, solar panel, water pump, Servomotor, GSM module and storage devices like battery. All the information about the particular crop can be gained by the farmer through his mobile phone, thus, his presence at field is not mandatory and can also control the motor from mobile itself. It allows technical knowledge and prediction about the weather over the cultivated field and thus safety can be assured. In addition to this, manual work on field is highly reduced and the proposed system can be implemented further to offer the farmer with smart idea.

Advantages of Proposed System

- Complete protection to the agricultural fields.
- It doesn't use the labour so the cost to the labour has been reduced.
- Conventional energy of solar energy is used to operate these systems.
- Fully automated system is used in the proposed technology.

Objective

- The main objective of this project is to provide a Smart Farming using Sensor technology, which collects all the information sensors and intimates the farmer through his mobile phone via GSM.
- In case any motion is detected around the farm it alerts through a message.
- The rain can also be monitored.
- The air quality around the crop can be detailed with SMS.
- The gases from the plants in the crop can be used to estimate the growth Level.
- The level of the well can be detected and the sump water can be pumped or filled accordingly.
- Thus, it also provides automatic drip irrigation by measuring the soil moisture level.
- In case of over flow of water in the crop field can be automatically removed with help of servo system.
- The temperature and humidity can be monitored with a real-time display.
- Thus, the solar panels are also used for effective system operation during power failures and also it can be used for various operations such as pumping, repellent, water treating, etc.

Block Diagram

FIG 0. Block Diagram of Proposed System

IV. Technology Required

The various technologies used were listed below,

A. Arduino Development Board

Fig 1.0 Arduino Controller

This development board can also be used to burn (upload) a new code to the board by simply using a USB cable to upload. The Arduino IDE provides a simplified integrated platform which can run on regular personal computers and allows users to write programs for Arduino using C or C++.

B. Global System for Mobile Communication (GSM)

Fig 1.1 GSM Module

GSM is combination of TDMA (Time Division Multiple Access), FDMA (Frequency Division Multiple Access) and Frequency hopping. Initially, GSM use two frequency bands of 25 MHz width: 890 to 915 MHz frequency band for up-link and 935 to 960 MHz frequency for down-link. Later on, two 75 MHz band were added. 1710 to 1785 MHz for up-link and 1805 to 1880 MHz for down- link. Up-link is the link from ground station to a satellite and down-link is the link from a satellite down to one or more ground stations or receivers.

C. Soil Moisture

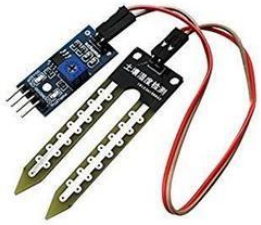

Fig 1.2 Soil Moisture Sensor

Soil moisture sensors measure the volumetric water content in soil**.** Since the direct gravimetric measurement of free soil moisture requires removing, drying, and weighing of a sample, soil moisture sensors measure the volumetric water content indirectly by using some

other property of the soil, such as electrical resistance, dielectric constant, or interaction with neutrons, as a proxy for the moisture content.

D. Humidity Sensor

Fig 1.3 Humidity Sensor

Humidity is the concentration of water vapour present in the air. Water vapour, the gaseous state of water, is generally invisible to the human eye. Humidity indicates the likelihood for precipitation, dew, or fog to be present. The amount of water vapour needed to achieve saturation increases as the temperature increases. As the temperature of a parcel of air decreases it will eventually reach the saturation point without adding or losing water mass.

E. Rain Sensor

Fig 1.4 Rain Sensor

A **rain sensor** or rain switch is a switching device activated by rainfall. There are two main applications for rain sensors. The first is a water conservation device connected to an automatic irrigation system that causes the system to shut down in the event of rainfall.

F. Ultrasonic Sensor

Fig 1.5 Ultrasonic Sensor

In a similar way to radar and sonar, ultrasonic transducers are used in systems which evaluate targets by interpreting the reflected signals. For example, by measuring the time between sending a signal and receiving an echo the distance of an object can be calculated. Passive ultrasonic sensors are basically microphones that detect ultrasonic noise that is present under certain conditions.

G. Air Quality Sensor

Fig 1.6 Air Quality Sensor

Air pollution sensors are devices that monitor the presence of air pollution in the surrounding area. They can be used for both indoor and outdoor environments. These sensors can be built at home, or bought from certain manufactures.

H. Voltage Sensor

Fig 1.7 Voltage Sensor

A voltage sensor is a sensor is used to calculate and monitor the amount of voltage in an object. Voltage sensors can determine either the AC voltage or DC voltage level.

I. Gas Sensor

Fig 1.8 Gas Sensor

A **gas sensor** is a device which detects the presence or concentration of gases in the atmosphere. Based on the concentration of the gas the sensor produces a corresponding potential difference by changing the resistance of the material inside the sensor, which can be measured as output voltage. Based on this voltage value the type and concentration of the gas can be estimated.

J. Passive Infrared Sensor (PIR)

Fig 1.9 PIR Sensor

The term PIR is the short form of the Passive InfraRed. The term “passive” indicates that the sensor does not actively take part in the process, which means, it does not emit the referred IR signals itself, rather passively detects the infrared radiations coming from the human body in the surrounding area.

K. Servomotor

Fig 1.10 Servomotor

The servo motor is most commonly used for high technology devices in the industrial applications like automation technology. It is a self-contained electrical device that rotates parts of machine with high efficiency and great precision. Moreover, the output shaft of this motor can be moved to a particular angle. Servo motors are mainly used in home electronics, toys, cars, airplanes and many more devices.

V. Hardware Results

The controlling section is totally based on controlling the water level in field for the following cases

- When the field is dry the control mechanism operates automatically on providing proper irrigation to the crop field. On contrast the level of irrigation is controlled by the pump which pumps the water to the required amount based on the programming concepts in Arduino.
- When the field is considered to over flood the automated process works on the servo motor to open field line in order to release the excess water from the field.
- The sensing section plays a vital role outside the field based on the water content or level in the well. Also, the field is being protected with all sorts of protection parameters by using various sensors.
- For eg. The ultrasonic sensor is used to detect the level of water present in the well by means of the distance of water from the sensor.

Controlling Section

a) As far as agriculture is concerned the soil field should be controlled on the basis of water level and thus if the water is said to be higher than that of the required level eg. Over flooding, the water level sensor gets activated automatically by sensing the level of water and thus the servo motor is made open on an automated manner through the Arduino programming. The opening of the servo motor releases the excess amount of water from the field outside it. Fig shows the block diagram on the field control of water level using water level sensor.

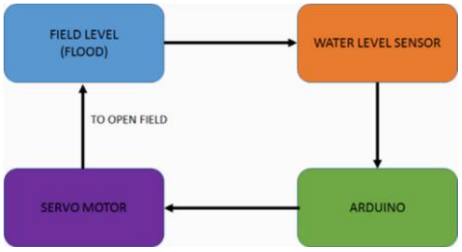

Fig 2.1 Block Diagram of Flood Controlling System

b) The second control mechanism deals with the nature of soil by using soil moisture sensor through which the water is being pumped with the help of a pump regulated with a relay circuit and thus proper irrigation is achieved. This happens when the soil is meant to be dry from the notification given by the sensor through the Arduino. The following fig shows the block diagram on the field control of soil and its related irrigation using soil moisture sensor.

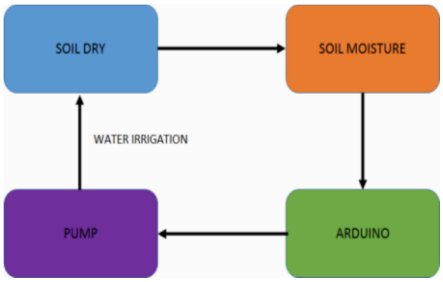

Fig 2.2 Block Diagram of Soil Moisture Controlling system

Sensing Section

- On providing protection to the agricultural field various sensors like PIR sensor, air quality sensor (MQ-2), gas sensor (MQ-135), humidity sensor etc, are used in order to provide utmost protection.
- The PIR sensor detects the motion in order to provide information's to the Arduino notifying the farmer that a motion is being detected in his/her field. The motion can be of an animal or a bird intervening the field.

- The air quality and gas sensors are used to check the quality of air and the level of required gases respectively and is being detected to the Arduino.
- The humidity sensor is used to detect the humidity level in the field and thus gives the information to the private weather station for the field being setup nearby the field using OLED display.

VI. Implemented Hardware Design & Output

The hardware of our proposed system is shown in the below fig 3.1, and the output of the nano system with temperature, humidity and heat induced is shown in fig 3.2.The test cases which have been evolved with different types of sensors and the outputs have been detailed with the serial monitor , which is indicated in fig 3.3& 3.4. The outputs in the serial monitor describes the air quality, gases evolved, well level using ultrasonic, GSM call, Servo system with canal open or close, PIR for the motion detection, Soil moisture sensor indicates the moisture level and shows whether the motor is

on oroff.

Fig 3.1 Implemented Hardware System

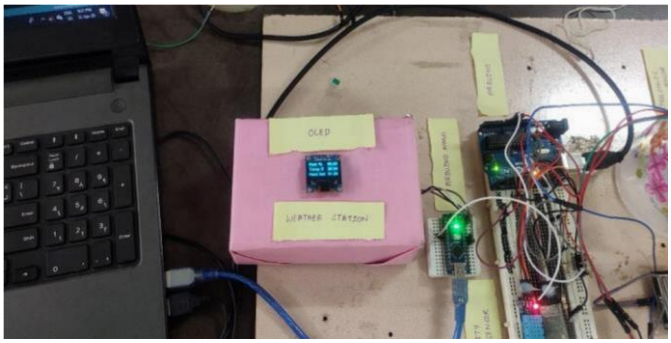

Fig 3.2 Output of temperature, humidity & heat induced

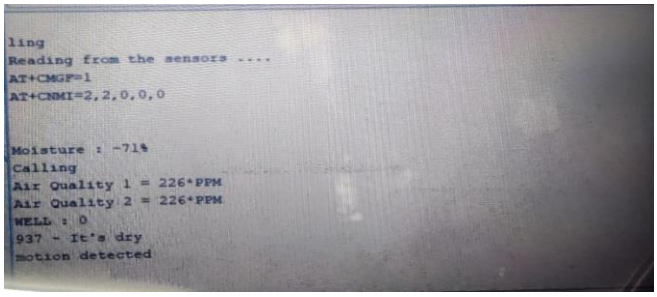

Fig 3.3 Output of serial monitor

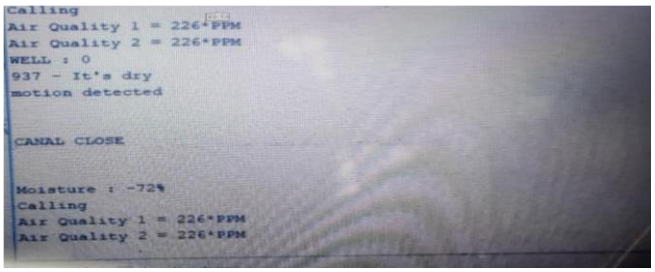

Fig 3.4 Output of serial monitor

VII. Conclusion

Thus, the real time working semi-real time model enables us to work in a fine environment of real time working world to achieve an initialization in automation to fine working culture. The automation totally avoids the labour cost in the system of management and enables to reduce the labour cost, to increase the yield in a marginal scale in a small-scale family farming design architecture. It is also used in large scale farming in a satisfied manner in case of typical situations of working management. It saves an amount in a marginal price. Small investments to save to large amount initialization in a proper manner. It is also used provide the overall security to the farm and intimates the farmer through GSM technology.

Smart Farming using sensor technology may be very useful for automated monitoring of farm and also intimates the farmer through GSM.

- The precision of crop growth can also be measured easily.
- The usage of solar energy is very essential for the energy back up system.
- Thus, the system also performs automatic drip irrigation.
- The servomotors are mainly used to automate the opening and closing of farms pit to reduce the water wastage.
- With this system the motions of animals and humans can also be detected.
- The system also intimates the rain alert automatically.
- The weather surrounding the crop can be monitored.
- The pollution level is also monitored.

So, in future technology the smart farming could play a vital role with precise and highly efficient crop productivity could be achieved.

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PROCEEDING OF
NATIONAL E-CONFERENCRE ON HARDWARESECURITY
Conducted on
25 TH AND 26 TH JUNE 2020

Paper Code
NCHS202003117

TITLE
CONCEALMENT OF DATA WITH MSB USING MODIFIED SECURE HASH ALGORITHM

AUTHORS
Mrs.P.Srividdhya, Mr.K.Dhanasekaran

ABSTRACT:
Data concealment is additionally necessary as a result of the key message that will share solely concealment of the info with image, audio, or video signal. The hacker will simply attack the message and take the key message. Therefore additional powerful concealment methodology and rule square measure needed. During this paper, we tend to discuss like that one amongst the rule. Modified secure hash algorithm that is that the advanced version of a message digest and secure hash function and conjointly exploitation the most significant bits (MSB) for knowledge concealment. Principally hackers attack solely Least significant Bits(LSB) simply however attack of MSB many times its injury the total message. Therefore finally concealment the info in MSB with modified hash algorithm results shows that not solely can do smart results and conjointly excellent concealment ability from completely different attacks with effective output

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CONCEALMENT OF DATA WITH MSB USING MODIFIED SECURE HASH ALGORITHM

Mrs.P.Srividdhya, Mr.K.Dhanasekaran

Abstract-Data concealment is additionally necessary as a result of the key message that will share solely concealment of the info with image, audio, or video signal. The hacker will simply attack the message and take the key message. Therefore additional powerful concealment methodology and rule square measure needed. During this paper, we tend to discuss like that one amongst the rule. Modified secure hash algorithm that is that the advanced version of a message digest and secure hash function and conjointly exploitation the most significant bits (MSB) for knowledge concealment. Principally hackers attack solely Least significant Bits(LSB) simply however attack of MSB many times its injury the total message. Therefore finally concealment the info in MSB with modified hash algorithm results shows that not solely can do smart results and conjointly excellent concealment ability from completely different attacks with effective output.

Index Terms- Data concealment, Modified secure hash algorithm, Most significant bits (MSB), Least Significant Bits (LSB),

Message digest, attack, hacker.

1 Introduction

Due to usage of network is quickly magnified now-a-days, that the security of knowledge is a lot of necessary. We have a tendency to area unit having a lot of algorithms however there's less security and hacker will simple determine the key[1]. Some rules have a lot of advanced to style thus principally user prefers the algorithm that is less difficult and economical.

In this paper the most aim is to style associate degree rule that is a lot of economical to cover the information and receiver will receive the key message while not corrupted. Equally we are able to use the methodology to cover the information in most significant bits (MSB). As a result of most of the activity techniques used LSB techniques to cover the key message thus hackers simply hack the LSB term. However we are able to hide the information in most significant bits (MSB) it's robust to spot the message[1].

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The secret message is activity with most significant bits (MSB) and cypher to image. That stego image is send to receiver wherever the image is decoded with the changed secure hash rule[2]. This rule will turn out the output as 1024 bits with a block size of 576 bits. By adding a lot of pictures will offer extra security to send the photographs[3].

It is a way to modulate a message within a medium of misunderstanding specified the existence of the message is each hidden and troublesome to recover once discovered[4]. Several algorithms and procedures, like Least Significant Bit (LSB), are written to cover text in a picture[5][6]. The goal is to create communication unintelligible to those that don't possess the correct keys.

Hiding information in most important Byte

In computing, the foremost vital bit is that the bit position in an exceedingly binary variety having the best worth. The most significant bits (MSB) is typically spoken because the high-order bit or left-most bit because of the convention in system of numeration of writing a lot of vital digits any to the left[10].

The most significant bits (MSB) may correspond to the sign little bit of a signed binary variety. In one's and two's complement notation, "1" signifies a negative variety and "0" signifies a positive variety[7].

It is common to assign every bit a grip variety starting from zero to N−1 wherever N is that the variety of bits within the binary illustration used. Normally, this is often merely the exponent for the corresponding bit weight in base-2. Though many CPU makers assign bit numbers the other means, the most significant bits (MSB) unambiguously remains the foremost vital bit. this might be one in every of the explanations why the term most significant bits (MSB) is usually used rather than a small amount variety, though the first reason is perhaps that completely different variety representations use different numbers of bits[6].

By extension, the foremost vital bits area unit the bits nearest to, and as well as, the MSB. The expressions most vital important bit initial and least significant bit initial area unit indications on the ordering of the sequence of the bits within the bytes sent over a wire in an exceedingly transmission protocol or in an exceedingly stream.

Most vital bit initial implies that the foremost significant bit can arrive first: thence e.g. the positional notation variety 0x12, 00010010 in binary illustration, can arrive because the sequence 00010010.

Least vital bit initial implies that the smallest amount vital bit can arrive first: thence e.g. an equivalent positional notation variety 0x12, once more 00010010 in binary illustration, can arrive because the sequence 01001000.

The below is mentioned the cryptography in most significant bits (MSB) term, wherever the message bit is 01101100 and therefore the secret message is 00110011. the key message is cypher with the most significant bits (MSB) term and obtained as a price of 00111100.

First four bits denotes the worth of secret codes and LSB is denotes the message bit value.

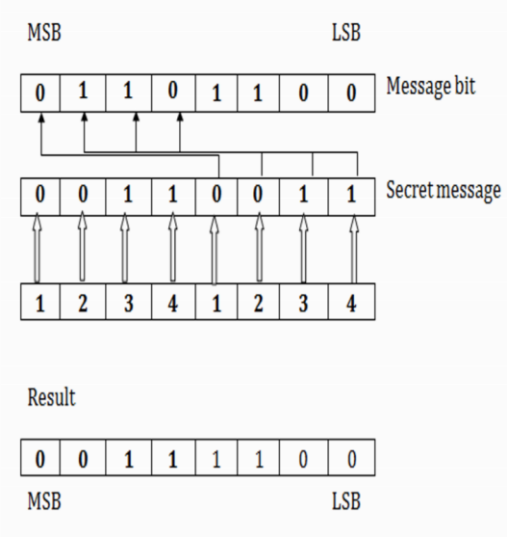


Fig.1. Encoding the secret message with MSB

Modified secure hash algorithm:

In the existing system LSB methodology begin by passing each secret message and canopy image into the encoder. Then within the encoder, one or many protocols are going to be enforced to imbed the key data into the quilt medium to supply another seem like copy of the first covering medium that it'll be referred to as stegoimage. A key's required within the embedding method. Key may be wont to scale back the possibility of third party attackers obtaining hold of the stegoimage and secret writing it to search out out the key data.

Hash rule is associate degree rule to secure the information with key. The classification of SHA (secure hash algorithm) could also be rely on security against collision attacks in bits. MD5 is associate degree rule that is simple to cover the information wherever its method but <18 collisions found. equally SHA-0, SHA-1, SHA-2, and SHA-3 wherever its method <34 collisions, <63 collisions and 112, 128 and 256 collisions attacks.

Our changed rule have the collision attacks has 256 bits. The entire rule may be processed with the LSB collision attacks however our rule may be exhausted most significant bits (MSB) that the capability of its extension attacks is 1024 bits. Changed secure hash rule is processed with key to cypher the information to cover within the image. Receiver additionally would like the key to rewrite the information.

Mostly hacker will decide to hack the key and rewrite the information in image. From purpose of hacker a lot of existing methodology won't to method with LSB so that they will target to rewrite the terms in LSB solely and procure wrong information. Whereas activity the information in most significant bits (MSB), it's not possible to search out the information and additionally mix with secure rule its create robust work to hack.

One is cypher the information with key and another one is while not key. If our rule cypher the information with key and at that very same time the key additionally send to the actual receiver with order format. Thus while not data of sender nobody will rewrite the information even a receiver additionally.

Consider the color image that its pixel worth is represent as R=10110111, G=10010100, B=11001001, and therefore the secret information that is cypher with the color image is 1001001, now apply the hash operate in most significant bits (MSB) term of color pictures and therefore additionally the position also determined.

The position of R=1,2,3, G=4,1,2 and B=3,4. that the secret message cypher with position of pixel and procure the result as R=10010111, G=00010100, B=1001001.

Encoding Process

Encoding is that the method of activity the information to audio, image or video with appropriate rule. during this section the cryptography method area unit consult with step by step

Step 1: Secret message is method with SHA rule with public key and cipher text area unit shaped. Cipher text could be a cryptography format of knowledge with rule.

Step 2: Choosen a cowl image. wherever cowl image is black and white suggests that it's a lot of economical to cover the information. as a result of compare with color image black and white image carries with it less pixel with high intensity. thus information may be simply mapped with it.

Step 3: Produce a stego image. Merge the quilt image and cipher text is termed stego image.

When the creation the stego image solely cryptography method is completed .

Step 4: the stego image is send to receiver. This stego image carries with it image and secret text. With the proper data of receiver solely this stego image may be transmitted to receiver.

Depend upon the rule the cryptography is a lot of economical, compare with the LSB process the mixture of most significant bits (MSB) with hash functioning is a lot of power rule to cypher the information with secure.

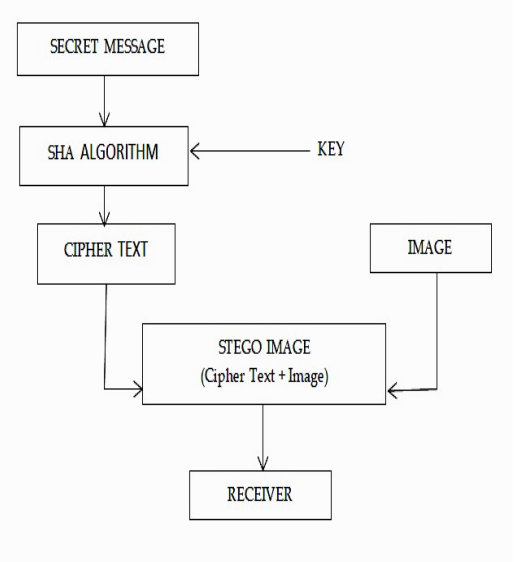


Fig.2. Creation of Stego Image

Decoding process

It is a method of decide the hide text within the given image.the step of secret writing is describe one by one

Step 1: Stego image is receive by receiver

Step 2:Decode the stego image and split one by one as image and text with correct secret writing rule.

Step 3: Apply hash operate rule with correct key in cipher text to spot the key information.

Step 4: Identification of secret information.

In this method the hash fuction is apply to the most significant bits (MSB) term rather than LSB the information that ought to be hide in most significant bits (MSB).

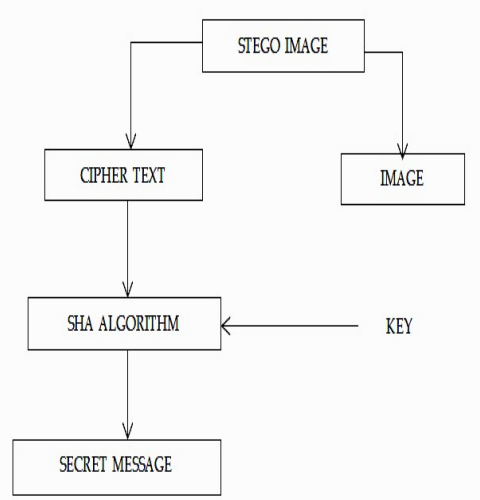


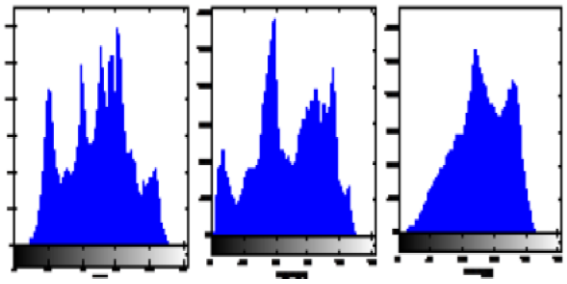
Fig.3. Decoding the Secret message

Simulation Result

Simulation is performed by completely different color pictures. Figure.4. is that the original cowl image wherever its bar chart worth is live and shown in figure.5. the information is encoded with image and therefore the encoded image is shown in Figure.7. and its bar chart is figure.8. currently compare the figure four and half-dozen wherever kind of like one another and bar chart are similar. Its mean that our projected rule is effectively utilized in cryptography when secret writing the text the PSNR are measured wherever compare with previous methodology our rule offer high accuracy worth.

A B C

Fig.4. Original image

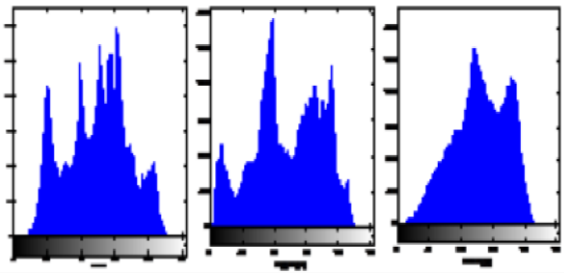


A B C

Fig.5. Histogram of original image

A B C

Fig.6. Encoded image with data



A B C

Fig.7. Histogram of encoded image with data

Table.1.PSNR value of the image

IMAGE NAME	HASH	MODIFIED HASH
A	47.5596	48.2645
B	41.5672	42.2756
C	38.5656	39.7012

Conclusion

In the previous methodology the information is method with LSB term thus hacker will simply hack the information and procure the key text. however our methodology the information is hide in most significant bits (MSB) term and cypher with the changed hash operate wherever it will perform a lot of collision to cover the information. thus hacker will feel issue to cover and our rule offer smart security to information within the image and obtained a high accuracy result with simple implementation method.

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TITLE
DETECTION OF DIABETIC RETINOPATHY USING MASKING ALGORITHM

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ABSTRACT:
Diabetic retinopathy is main cause of the vision-loss in adults. The diabetic retinopathy consists of background vessels, retina, fundus images, vessels and non-vessels images. Due to diabetic retinopathy, around 4.2 million of adults had the diabetic retinopathy and 655,000 had the vision-loss, which are maximized every day. It is said to be one of the most common complication of the DM (Diabetes Mellitus). The treatment of diabetic retinopathy is not easy as there is no symptom presented at early phase and patients hardly notice the vision-loss. Most of the people couldn't recognize that they have the diabetic retinopathy until the disease is started to affect their eye that generally occurs in final phase. As an outcome, most of the people might not go via the treatment. Therefore, the scheme of coordinated management is very crucial to address the clinical challenges of the diabetic retinopathy and preventing its development. Early classification and identification of retinal images are being very serious concern to research community. In our proposed system we are going to identify the presence of diabetic retinopathy from retinal fundus images using MATLAB R2013a.

DETECTION OF DIABETIC RETINOPATHY USING MASKING ALGORITHM

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Keywords—Diabetic retinopathy, Retinal fundus images, Diabetic Mellitus, MATLAB

I. INTRODUCTION

According to estimation by The World Health Organistion(WHO), there are 347 million people affected by Diabetes and it predicts that Diabetes will be the seventh major cause of deaths worldwide by 2030. Diabetic Retinopathy(DR) is the most common form of diabetic eye disease. It usually affects people who have diagnosed or un diagnosed diabetes for a significant number of years. Retinopathy can affect all diabetics and increasing the risk of blindness, if it is left untreated. The risk of developing diabetic retinopathy is known to increase with less well controlled

blood sugar as well with age and blood pressure level. DR occurs when changes in the blood glucose levels cause changes in the retinal blood vessels. These blood vessels will swell up and leak fluid into the rear of the eye.

In other cases, abnormal blood vessels will grow on the surface of the retina. DR can gradually become more serious and can lead to blindness, unless treated.

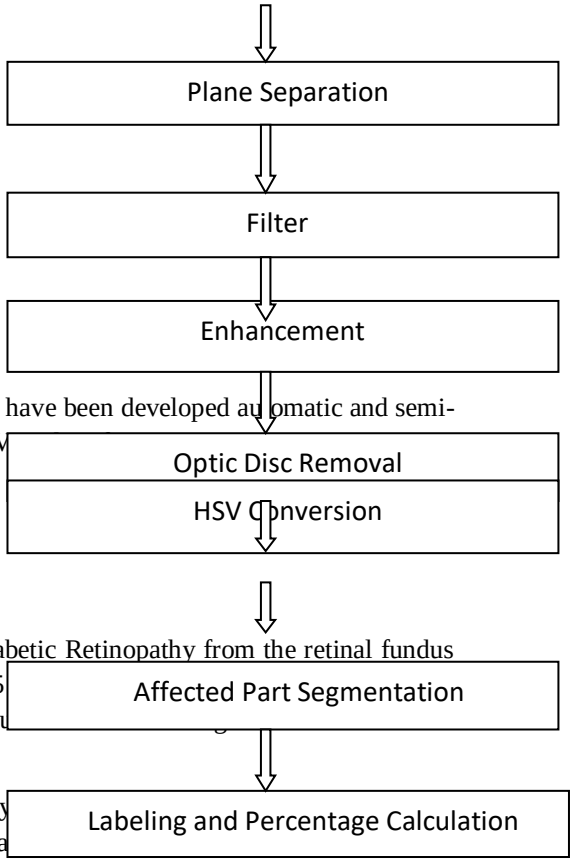
The main stages of this disease are non-proliferative and proliferative retinopathy. DR can be categorized as Microaneurysm, Haemorrhages and red lesions like hard exudates, soft exudates and veins. The early stage of this disease is called Microaneurysm(MAs). In this stage, the blood vessels may become swell or bulge(aneurysm). The swelling in the retina is caused by the leakage of fluid by the blood vessels. This condition is called macular edema, and it changes the vision of the individuals with the disease. The blurriness is similar to trying to look through water. The retina consists of fluid deposits that may clear up on their own, but fatty deposits in the retina sometimes remain that can have an effect on vision. In many instances when the small blood vessels close down, new, unhealthy blood vessels can grow. These unhealthy blood vessels are unfit to feed the retina. This stage is called proliferative diabetic retinopathy.

The fundus image of the retina can be obtained from the fundus camera are often imperfect, normally in low contrast and blurry. The accurate diagnosing of DR is a very difficult task for the several reasons: 1) the presence of lesions, exudates, haemorrhages; 2) the variability of the blood vessel width and length; 3) the low contrast between the vessels and the background; 4) the central reflex on large vessels; 5) the presence of small regions affected by noise; and 6) the conclusion between vessels. Sample of fundus images are shown in Figure 1.

(a)Normal (b)DR

Fig 1. Fundus Image

In order to improve the reliability of diagnosis, several previous studies have been developed automatic and semi-automatic diagnosis of medical images using Masking algorithm and SV



II. RELATED WORK

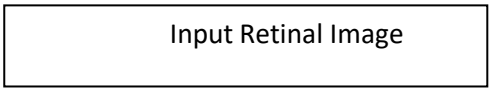
Most of the researches have focused on the automatic detection of Diabetic Retinopathy from the retinal fundus images. In existing, they have analyzed MA detect ability using small 25 images. Raw pixel intensities of extracted patches served directly as inpu forest(RF) and an automatic neural network(ANN).

They have explored the use of two techniques(principal component analy for reducing the input dimensionality. This techniques involves too ma will be biased towards features with high variance, leading to false results.

The sensitivity or specificity of the existing algorithm for the detection of diabetic retinopathy is not sufficient enough to be used for medical applications. The shape and location of the presence of diabetic retinopathy in retinal fundus images is very unpredictable. The red lesions can be found in the macula, overlapping in the blood vessels or near the optic disc. Also, the shape of the lesions is not determined.

III. PROPOSED METHOD

In our proposed system, firstly retinal fundus image (RGB) will be used. Then that will be preprocessed. Preprocessing consists of plane separation, filtering, enhancement. Then by using masking algorithm and HSV intensity values retinal image is segmented to detect affected part. Then labeling and affected percentage calculation will be performed. The workflow of our proposed system is as follows:

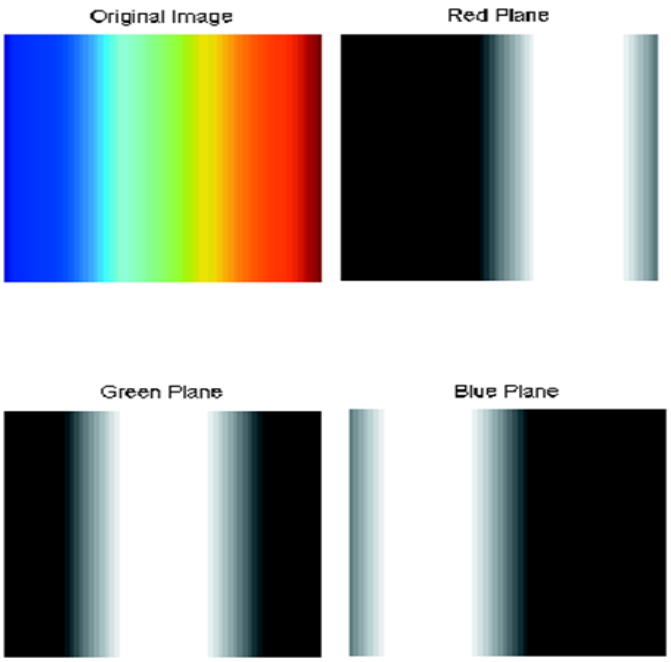


(a) INPUT IMAGE- RGB COLOR MODEL

An RGB image, sometimes referred to as a *true color* image, is stored in MATLAB as an m-by-n-by-3 data array that defines red, green, and blue color components for each individual pixel. RGB images do not use a palette. At the pixel's location, the color of each pixel is determined by the combination of the red, green, and blue intensities stored in each color plane. Graphics file formats store RGB images as 24-bit images, where the red, green, and blue components are 8 bits each. This yields a potential of 16 million colors. The precision with which a real-life image can be replicated has led to the commonly used term true color image. The RGB color model is an additive color model in which red, green and blue light are added together in various ways to reproduce a broad array of colors. The name of the model comes from the initials of the three additive primary colors, red, green, and blue. The main purpose of the RGB color model is for the sensing, representation and display of images in electronic systems, such as televisions and computers, though it has also been used in conventional photography. Before the electronic age, the RGB color model already had a solid theory behind it, based in human perception of colors.

(b) PLANE SEPARATION

An RGB MATLAB array can be of class `double`, `uint8`, or `uint16`. In an RGB array of class `double`, each color component is a value between 0 and 1. A pixel whose color components are (0, 0, 0) displays as black, and a pixel whose color components are (1, 1, 1) displays as white. The three color components for each pixel are stored along the third dimension of the data array. Plane separation is illustrated below.



(c) FILTER

The ultimate aim of the median filter is to run through the signal entry by entry, replacing each entry with the median of neighboring entries. The pattern of neighbors is known as "window", which slides, entry by entry, over the entire signal. If the window has an odd number of entries, then the median is just the middle value after all the entries in the window are sorted numerically. For an even number of entries, there is more than one possible median, see median for more details.

The nonlinear digital filtering technique called as median filter, used to remove noise from an image or signal. Such noise reduction is a typical pre-processing step to increase the results of later processing. The median filter is an algorithm that is useful for the removal of impulse noise (also known as binary noise), which is manifested in a digital image by corruption of the captured image with bright and dark pixels that randomly appear throughout the spatial distribution. The median filter, when applied to grey scale images, is a neighborhood brightness-ranking algorithm that works by first placing the brightness values of the pixels from each neighborhood in ascending order. The median or middle value of this ordered sequence is then selected as the representative brightness value for that neighbourhood. Subsequently, each pixel of the filtered image is defined as the median brightness value of its corresponding neighbourhood in the original image. Median filter is used to remove the speckle noise and salt-and-pepper noise (impulsive noise). It preserves the edges of an image than other filters.

(d) ENHANCEMENT

Image Enhancement is the technique to increase the interpretability or perception of information in images for human viewers. It is to increase the image quality so that the resultant image is better than the original image for a specific application. The main purpose of image enhancement

is to bring out detail that is hidden in an image or to improve contrast in a low contrast image. Image enhancement can be done by increasing contrast and removing noise from the image or if image is blurred then we remove blurring also. . In addition HE, AHE will also make the medium brightness

toward the middle gray level of an image disregarding of the input image, and introduce objectionable artifacts and affected contrast effects. This makes the visual quality of processed imagery inadequate image histograms resembles each other as much as possible. In image acquisition process, if noise is present in the image that will become an error. In result we have an image that does not give the true intensity of the image pixels. The removal of noise from a signal or from an image is called noise reduction process. Conceptually, the signal processing as same as the noise reduction technique. However, the knowledge of input signal is required by which we can find the expected output that is depend on the type of signal. Firstly image captured by the sensor then image goes under different types of smoothing filters after that we have the output or resultant image.

(e) OPTIC DISC REMOVAL

Optical disc, it is a part in normal human eye which carries 1 to 1.2 million afferent(conducted inwards) nerve fibres from the eye towards the brain. The optical disc occupies huge area of the fundus image and it should be eliminated for easy indication. the optical disc present in RGB fundus images is shiny, yellowish or white colored and almost round in shape. The optical disc removed by giving the grey image as input. After processing, the optical disc part will be white color and the remaining parts will be in black color.

(f) HSV CONVERSION

The HSV color wheel is sometimes represented as a cone or cylinder. As hue varies from 0 to 1.0, the corresponding colors vary from red through yellow, green, cyan, blue, magenta, and back to red, so that there are actually red values both at 0 and 1.0. As saturation varies from 0 to 1.0, the corresponding colors (hues) vary from unsaturated (shades of gray) to fully saturated (no white component). As value, or brightness, varies from 0 to 1.0, the corresponding colors become increasingly brighter.

The processing of color vision is done by using RGB color space or HSV color space. RGB color space describes colors in terms of the amount of red, green, and blue present. HSV color space describes colors in terms of the Hue, Saturation, and Value. In situations where color description plays an integral role, the HSV color model is often preferred over the RGB model. The HSV model describes colors similarly to how the human eye tends to perceive color. RGB defines color in terms of a combination of primary colors, whereas, HSV describes color using more familiar comparisons such as color, vibrancy and brightness.

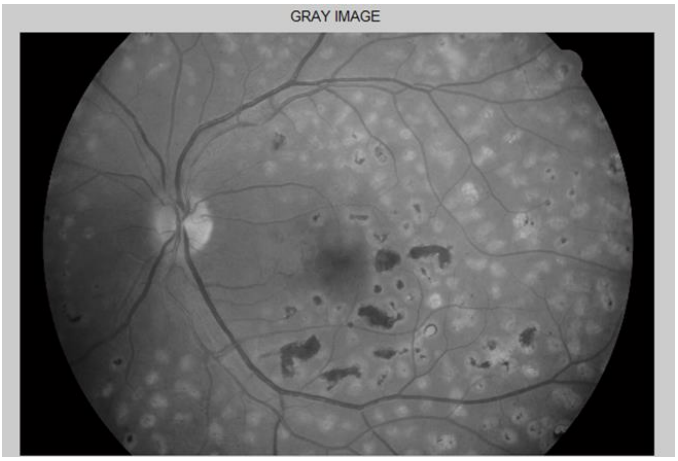
(g) SEGMENTATION

Image segmentation is the process of dividing an image into many parts. This is typically used to fnd out the objects or other relevant information in digital images. The process in which partitioning an image into parts or regions is known as Image . This segmentation into parts is often based on the characteristics of the pixels in the image. For example, the way to identify the regions in an image is to look for abrupt discontinuities in pixel values, which typically indicate edges. These edges can define regions. Other methods divide the image into regions based on color values or texture.

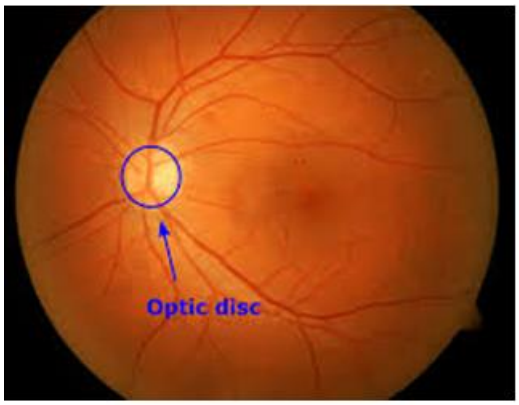
(h) PERCENTAGE CALCULATION

Affected percentage will be calculated based on the mathematical formula given below.

$$\text{affected portion}(\%) = \frac{\text{no of pixels in affected portion} * 100}{\text{total no of pixels in retinal portion}}$$



 ISBN: 978-93-5406-440-1

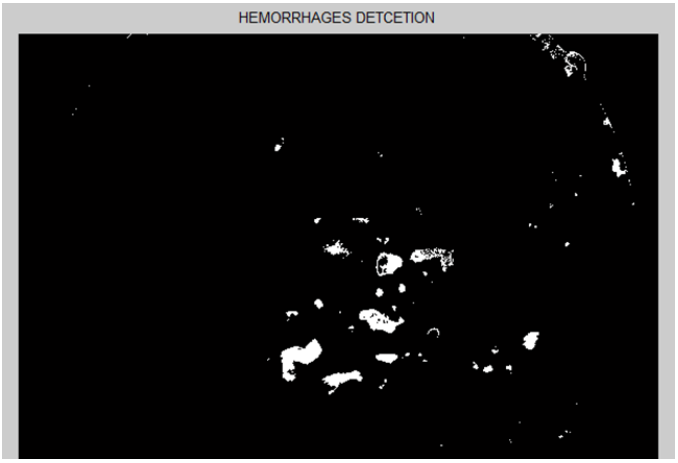


IV MASKING SEGMENTATION

Masking involves locating some of the pixel values in an image to zero, or some other "background" value. Masking can be done in one of two ways: Use an image as a mask. A mask image is just an image where some of the pixel intensity values are zero, and others are non-zero. Anywhere the pixel intensity value is zero in the mask image, then the pixel intensity of the resulting masked image will be set to the background value (normally zero). Use a set of ROIs as the mask. The ROIs for each slice are used to label the mask. If you use ROIs as a mask, you might in addition perform soft masking, to set the intensity of masked pixels not to the background value, but a value that depends on how much of an individual pixel is within the mask. In general, pixels that are inside the mask do not have their pixel values changed: they are missing at the same intensity as the input image. Though, you can also generate images with binary intensity values (either 0 outside the mask, or 1 inside the mask) by selecting.

The Image Masking takes an input image, masks it, and produces a new image which is a copy of the input image, except that the new image will have its pixel intensity value set to zero (or some other chosen background intensity value) in proportion to the mask and the masking operations performed.

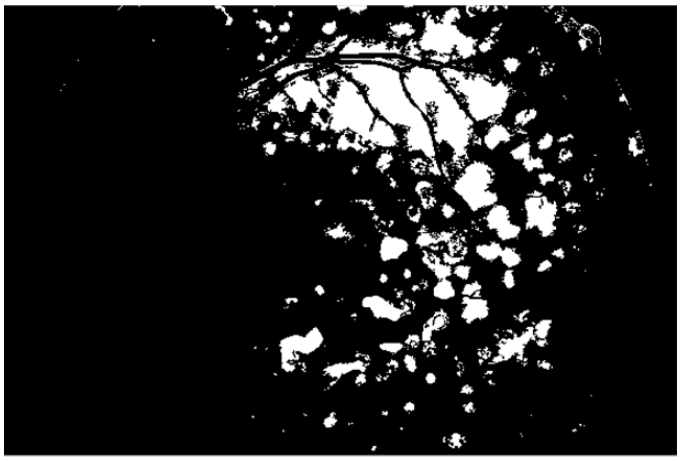
Here we have performed masking based on the HSV image intensity values and abnormal regions will be represented as 1, normal regions will be represented as 0.



V BINARY CONVERSION

.

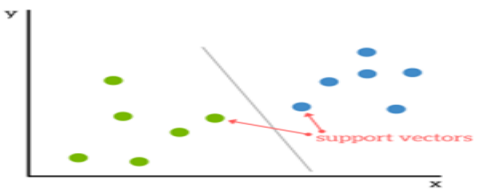
Binary images are produced from color images by segmentation. Segmentation is the process of assigning each pixel in the source image to two or more classes. If there are more than two classes then the usual result is several binary images. The simplest form of segmentation is probably Otsu's method which assigns pixels to foreground or background based on grayscale intensity. Another method is the watershed algorithm. Edge detection also often creates a binary image with some pixels assigned to edge pixels, and is also a first step in further segmentation.



VI SVM CLASSIFICATION

Support Vector Machine (SVM) is a supervised learning technique that is used for discovering patterns for classification of data. An SVM model is a depiction of the examples as points in space, mapped so that the examples of the separate categories are divided by a clear gap that is as wide as possible. As well as performing linear classification, SVMs can efficiently perform a non-linear classification using what is called the kernel trick, implicitly mapping their inputs into high-dimensional feature spaces.

Classifying data is a common mission in machine learning. Assume some given data points each belong to one of two classes, and the objective is to choose which class a new data point will be in. In the case of support-vector machines, a data point is viewed as a p-dimensional vector, and we want to know whether we can separate such points with a (p-1)-dimensional hyper plane. This is called a linear classifier. There are many hyper planes that may classify the data. One reasonable preference as the best hyper plane is the one that represents the largest separation, or margin, between the two classes. So we prefer the hyper plane so that the distance from it to the nearest data point on each side is maximized. If such a hyper plane exists, it is called as the maximum-margin hyper plane and the linear classifier it is known as a maximum-margin classifier; or equivalently, the perception of optimal stability.



VII RESULT

VIII CONCLUSION

Diabetic retinopathy is a disease caused by increased permeability of retinal vessels. Its incidence and prevalence have been increasing due to urbanization, greater life expectancy and the habits of modern life. Its onset is insidious and it may lead to blindness in 75% of individuals who have been diabetic for more than 20 years. So we have developed image processing system to detect diabetic retinopathy at an early stage. Our proposed model can effectively segment out affected regions using masking algorithm and value plane exudates extraction. Finally we have calculated affected portion percentage using mathematical analysis. Our future work includes stages identification by extracting more features from fundus images.

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TITLE
IOT BASED SMART FARMING AND CROP ANALYSIS TO YIELD INCREASE IN FOOD PRODUCTION

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ABSTRACT:
As the world is developing towards new technology such as civic technology, crypto currency, cognitive cloud computing and artificial intelligence it is very much essential that there is a development needed in agriculture sector due to increase in population and decline food production due to various environmental factors. Some developments have been done in the field of agriculture and most of the developments that are network protocol based on placing various sensors in environment field and the work of sensors is to detect such as temperature, pressure, humidity, soil moisture, concentration of gas surrounding so on. Sensing the environment by using sensors is not a great development in yielding crops, the automation must be implemented to helps in yielding more crops and development in agriculture too. So IOT based system is implemented to design farming system which ultimately yields better production by smart monitoring so existing food needs due to population diversity in coming years can be resolved .

IOT BASED SMART FARMING AND CROP ANALYSIS TO YIELD INCREASE IN FOOD PRODUCTION

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ABSTRACT: ***As the world is developing towards new technology such as civic technology, crypto currency, cognitive cloud computing and artificial intelligence it is very much essential that there is a development needed in agriculture sector due to increase in population and decline food production due to various environmental factors. Some developments have been done in the field of agriculture and most of the developments that are network protocol based on placing various sensors in environment field and the work of sensors is to detect such as temperature, pressure, humidity, soil moisture, concentration of gas surrounding so on. Sensing the environment by using sensors is not a great development in yielding crops, the automation must be implemented to helps in yielding more crops and development in agriculture too. So IOT based system is implemented to design farming system which ultimately yields better production by smart monitoring so existing food needs due to population diversity in coming years can be resolved .***

Keywords: IOT, Smart Farm, Sensors, Embedded System, WSN

I. INTRODUCTION

The Internet of Things is booming technology in current situation for many applications; it is mainly used to connect devices. As the global population will reach about 10 billion in some year and to meet the needs of people for food is so hard. Hence IOT is implemented to design a smart system which ultimately yields better production by smart monitoring and farming so existing food needs due to population diversity in coming years can be resolved. The most important problem facing in present agriculture is the dynamic changes in weather, environment and its impact. IOT help us to and stop these problems and help in more agriculture cultivation[1-3].

The application of IOT in agriculture are to detect temperature,, pressure, humidity, gas detection, flame detection, water level detection, moisture detection in field and so on. IOT help farmer to get the status about their environment field. It helps the farmers to increase their productivity and decrease the active time. The fig. 1 depicts the typical IOT based agriculture farming [4-6]

Fig. 1. Typical IOT Based Agriculture farming

II. IOT BASED WSN APPLICATION IN AGRICULTURE FARMING

An embedded system is commonly referred as a computer system and a combination of processor, memory; it performs function with larger mechanical or electrical system which mainly used to control devices by using embedded system we can perform a single or multiple function it has been designed in that way to perform the functions.[7-9] The main purpose of embedded system in IOT is used to control devices. Some smart farming methods are discussed by D. Boskovic where a innovative fire detection in forest was proposed using a wireless sensor network. M. Saoudi talked about systematic mining using the wireless sensor network. P. Dhuliya converse about a finding about a disaster using wireless sensor network. The block diagram of typical embedded system is shown in fig. 2. [8-10]

Fig. 2. Block diagram of typical embedded system

Fig. 3.

III. IOT BASED SMART FARMING SYSTEM ARCHITECTURE & SENSOR DESIGN

IV.

The IoT based smart farming system architecture consists of Arduino UNO, GSM SIM300, sensor for soil moisture, Temperature, Humidity and water level other sensors that have been used in the proposed model are discussed below:

A. DHT11 Sensor:

DHT11 is used in this method to detect the temperature and humidity in the surrounding method. DHT11 sensor it is very fast responding and it offers a very high quality. It is attached to a 8-bit microcontroller which is a high performing processor. DHT11 sensor is referred as digital sensor which is less cost [11]. This sensor not only a high quality sensor but also give very accurate results in reading the measurement of temperature and humidity. It reads the relative humidity value in the unit of percentage and reads temperature in the unit degree Celsius. DHT11 sensor consists of four pin. In that one pin is dummy pin shows that it is not in use and the other three pins are connected to GND, DATA, VCC supply dc voltage of 3.3 to 5volt, DATA is a digital output pin, GND is connected to ground and NC is not in use. These are the structure of DHT11 sensor. [12]

B. FIRE SENSOR:

Fire sensor is also called as flame detection or flame detector. Fire sensor as the name implies this sensor has being. Used to detect the fire in the environment field. As soon as this sensor detects the fire the fire sensor turns on indicating a light in the fire sensor. To make us indicate about the fire that has happened. The fire sensor that has been connected to a buzzer. As the fire sensor detect the fire the sensor turns on and send the signal to the buzzer. The buzzer after receiving the signal from the fire sensor the buzzer gives a sound alarm to indicate that there is a fire accident happens. As said above the fire sensor works in the environmental field.[13]

C. Water level Sensor

In agriculture water plays a very essential role that is one of the important reason in agriculture to yield more

crops. Water level sensor is used to find the water level in the tank or in any other material. By using this sensor we can detect the water in the tank is in required level or in below required level. Water level sensor that has connected to a water pump motor[14]. So that level sensor find the water is below the required level then it send signal to water pump motor to pump water from ground. Water level sensor is mainly used to find the water level in the tank. In agriculture as said above water is a very essential thing. So, that water level sensor is very useful in helping to know about the level of water in water tank.

D. Soil moisture Sensor

Soil moisture sensor that has been used to detect the condition of soil in the environmental field. Soil moisture sensor detects the type of soil, moisture level in the soil, nutrients in the soil and quality of the soil. The above said are the most important feature to yield more crops in the agricultural field. So, that soil moisture sensor helps the farmer to get more profit by yielding crops.[15-16]

E. ***Gas sensor***

Gas sensor is used to detect the presence of gas in the atmosphere field. It is generally used to detect the concentration in the gas in atmosphere. Various gases that are detected by the gas sensors like oxygen, carbon dioxide , nitrogen , methane etc . Gas sensor is mainly used to detect that there is any toxic content in the atmosphere. If there is any toxic content in air it affects in agriculture. So that gas sensor helps in finding way is there is any other gases in atmosphere. As said above gas sensor performs in such a about detecting of concentration of gas in atmosphere.[17]

F. Buzzer

A buzzer in other name called as a beeper. Buzzer is used as an indicating signal. Buzzer indicates by given an signaling in audio format. As the buzzer it is connected to a fire sensor. When the fire sensor detect fire the fire sensor turns on and it indicates the buzzer through audio signal . As said above buzzer perform in smart farming.

V. SOFTWARE USED IN SMART FARM:

A. Embedded C

In our daily life hundreds of electronic device are by the embedded like TV, DVD, microwave and digital camera. These device are composed of microprocessor and microcontroller inside their body. These microprocessor perform several operation. Embedded C is the most prominent embedded software language. Many embedded software is written in embedded C. Embedded C code written is for blinking the LED connection with port 0. Embedded C has a different kind of thought process to use. Embedded system like camera, tv are designed to perform a single task. They designed like efficient and cheap when performing their task. Thus embedded system we have small hardware, small ram and rom. We want to write the program to run in the processor by maximum effect. Embedded C is programming language lies in high level and low level language. By the speed growth of human population the old farming methods are not able to grow.

Thus smart farm method is needed for large growth. In the similar of few years smart farming system based on embedded system and Internet of things (IOT) getting famous among the people. This paper is described about farming system based on embedded system, IOT and wireless sensor used in farms[18].

B. ARDUINO IDE

Arduino is an open-source platform used for building electronics projects. Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller). Arduino software that has being installed to upload code to know about the result of the arduino uno board that has connected to the computer. The required programs in the software that are return using arduino software and it is also called as sketches. The fig 3 & 4 shows the arduino uno board screen.

Fig. 4. Arduino software

Fig. 5. Arduino software code structure

Fig. 6. Prototype of Smart Farm

The above fig. 5 is the prototype of Smart Farming system which shows the various sensors that has been connected to an Adruino Uno board. The various sensors such as DHT11 sensor that has been used to detect the temperature and humidity of the surrounding, soil moisture sensor that has been used to find the type of soil moisture in the soil and the quality of the soil, gas sensor that has been used to detect the presence or concentration of gases in the atmosphere, fire sensor that has been used to detect the fire. Buzzer or beeper is device that has been used as an indication audio signal when there is fire accident happens, water pump motor that has been used when the level sensor shows the water is below the required level then the water pump motor has used to self-dug water from ground. The current status of the field is detected through the sensors and the values have been send through IOT and displayed in web page.[19-20]

VII. CONCLUSION AND FUTURE WORK

In upcoming years, world population will reach up to 10 billion, to meet up the needs of foods. Hence an essential transformation needed in agriculture system i.e. smart farming. The proposed system based on IOT brings a very good impact in agriculture. It helps the farmers to know about the accurate detail about agriculture field impact by the environmental changes. In coming years the implementation of organic based smart farming will meet up the needs of food requires for the people in much better way and also Eco – friendly system.

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TITLE
IDENTIFICATION & ANALYSIS OF PALM PRINT IN BIOMETRIC AUTHENTICATION SYSTEM USING K-NN ALGORITHM

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ABSTRACT:
Now a days information security is of utmost important one can be at the risk of information or identity theft.To avoid this biometric authentication is used to categorise and identify behavioural characteristics of a person and give access.Palm recognition plays a acrucial role in identification of person based on the whole geometry of the hand,The main objective is to identify and distinguish the scanned palm.Main work of the palm recognition is preprocessing of the image and extracting the features using clustering algorithm and classification is used and performance is compared in both cases

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Abstract—Now a days information security is of utmost important one can be at the risk of information or identity theft.To avoid this biometric authentication is used to categorise and identify behavioural characteristics of a person and give access.Palm recognition plays a acrucial role in identification of person based on the whole geometry of the hand,The main objective is to identify and distinguish the scanned palm.Main work of the palm recognition is preprocessing of the image and extracting the features using clustering algorithm and classification is used and performance is compared in both cases

I. INTRODUCTION

In recent years, there is a great interest of many researchers on the Palm recognition problem. Among these researchers are the engineers, neuroscientists, and psychophysicists studying this problem in different fields and in different points of view. There are several application areas of Palm recognition in our real life such as identification of personnel using credit cards, passport checks, entrance control, criminal investigations, etc.Along with well known methods such as fingerprint or DNA recognition, Palm recognition opens new possibilities. Many prerequisites for putting Palm recognition into practice, eg, Palm localization in digital cameras, have already been adopted by companies and are commercially available. Palm
Department Of Electronics and communication engineering, recognition is already being implemented into image organizing software, web applications , mobile devices, and passports already contain Palm biometric data . All this implies that Palm recognition is an increasingly important field of biometry. The advantages of Palm recognition are relatively modest requirements on hardware and simple real-time process from the viewpoint of the identified subjects.

II. IMAGE PROCESSING

In the literature, the approaches to the solution of Palm recognition problem are divided into three types, namely frontal, profile and view-tolerant algorithms depending on both the kind of imagery (different views) available, and on the employed recognition algorithms.

In the frontal recognition approach, which is that the classical approach, a pre-processing step finds and extracts countenance in head-on 2D Palm images which then are matched against the features of a Palm database. The frontal images contain inherently more discrimination power than facial profiles, but the analysis of such head-on images is computationally much more complex and analytically more sensitive to variation of illumination and pose.

Profile recognition approaches as stand-alone systems, include an initial search over a large Palm database to index candidates who then are subject to a more accurate but computationally expensive

frontal recognition. These approaches are very practical, easy to analyze and therefore they allow fast algorithms and show sufficiently high number of details to support Palm recognition.

On the other hand, view-tolerant recognition approaches perform recognition in a more sophisticated fashion by taking into consideration some of the underlying physics, geometry and statistics. They employ various techniques to correct for perspective or pose based effects due to illumination and 3D nature of the head. In addition to these, there are also hybrid approaches which combine more than one approach and try to overcome the short comings of the individual approaches.

III.PALM RECOGNITION

Palm recognition is one of the most popular problems in the field of image analysis and understanding. Identifying a person from an unknown Palm is usually done by comparing the unknown Palm with the known data from a Palm database. The interest of researchers and engineers in Palm recognition problem has grown rapidly in the recent years since there is a wide range of commercial and law enforcement applications on Palm recognition. The increasing need for surveillance-related applications, especially due to drug traffic and terrorist activities, has a great impact on the growth of interest in the field of Palm recognition. Some of the application areas of Palm recognition includes personnel identification of credit cards, driver's licence, passport checks, entrance control, computer access control, criminal investigations, crowd surveillance, witness Palm reconstruction, and ATM machines.

The people interested in Palm recognition problem are not only the engineers who work in the area of machine learning, but also psychophysicists and neuroscientists are studying on this problem to understand human recognition mechanisms. The studies and findings of psychophysicists and neuroscientists help the engineers who are designin or implementing algorithms or systems for machine recognition of faces.

The solution to the Palm recognition problem is mainly divided into three parts. Segmentation of faces from cluttered scenes or Palm detection is the first stage of the solution. Then, the feature extraction should be done from the Palm region and finally a decision should be taken. The result of the decision process is either recognition, verification or categorization of an unknown(test) Palm by comparing the Palm with a database of faces. However, solving the problem is not easy since there are technical problems common to all Palm recognition problems such as the lack of robustness to illumination and pose variations.

A. *Palm Image*

A digital image may be a discrete two-dimensional function f(x,y) which has been quantized over its domain and range .Without loss of generality, it'll be assumed that the image is rectangular, and w)f(x-1,y-1) rock bottom right corner.Each distinct coordinate in a picture is named a pixel, which is brief for pixel .The nature of the output of f(x,y) for every pixel depends on the sort of image.Most images are the results of measuring a selected natural phenomenon , like light, heat, distance, or energy.

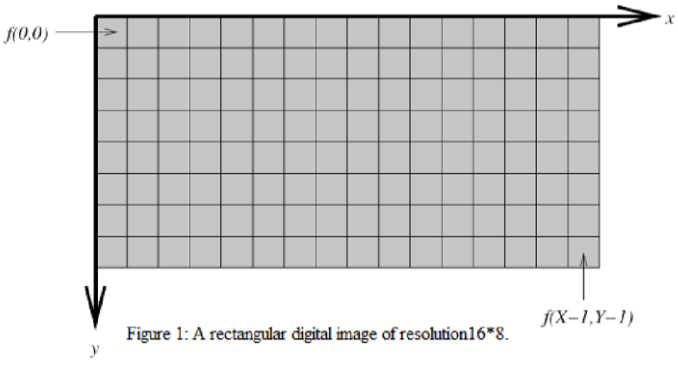

Figure 1: A rectangular digital image of resolution16*8.

The minimum brightness is black, and the maximum brightness is white. A typical example is given in Figure 2. A colour image measures the intensity and chrominance of light. Each colour pixel is a vector of colour components. Common colour spaces are RGB (red, green and blue), HSV (hue,

saturation, value), and CMYK (cyan, magenta, yellow, black), which is used in the printing industry. Pixels during a range image measure the depth of distance to an object within the scene.Range data is usually utilized in machine vision applications.For storage purposes, pixel values got to be quantized.The brightness in grey scale images is usually quantized tolevels, so f(x,y) belongs to {0 1 …...z-1} .If z has the form 2the image is referred to as having L ¡bits per pixel. Many common grey scale images use 8 bits per pixel giving 256 distinct grey levels This is a rough bound on the amount of various intensities the human sensory system is in a position to discern.For an equivalent reasons, each component during a colour pixel is typically stored using 8 bits.Medical scans often use 12-16 bits per pixel, because their accuracy might be critically important.Those images to be processed predominantly by machine may often use higher values to avoid loss of accuracy throughout processing.Images not encoding light intensity, like range data, can also require a bigger value of z to store sufficient distance information.Some measure bands of the spectrum like infra-red or radio, or heat, within the case of thermal images.Volume images are literally three dimensional images, with each pixel being called a voxel.

In some cases, volume images may be treated as adjacent twodimensional image slices.Although this thesis deals with grayscale images, it is often straight forward to extend the methods to function with different types of images.

B. *Recognition of Palm*

Palm recognition from images is a sub-area of the general object recognition problem.The environment surrounding a Palm recognition application can cover a wide spectrum - from a well controlled environment to an uncontrolled one. In a controlled environment, frontal and profile photographs of human faces are taken, complete with a uniform back ground and identical poses among the participants. These Palm images are commonly called mug shots. The mug shot can be extracted to a normalized part called a canonical Palm image. In a canonical Palm image, the size and position of the Palm are normalized approximately to the predefined values and the background region is minimized. Palm recognition techniques for canonical images have been successfully developed by many Palm recognition systems.

General Palm recognition, a task that is completed by humans in daily activities, comes from a nearly uncontrolled setting. Systems to mechanically acknowledge faces from uncontrolled setting should 1st sight faces in detected pictures.A scene could or may not contain a gaggle of faces; if it will, their locations and sizes at intervals the image should be calculable before recognition will happen by a system which can acknowledge solely canonical faces. A Palm detection task is to report the situation, and generally conjointly the dimensions, of all the faces from a given image. we are able to see that recognition of human faces from Associate in Nursing uncontrolled setting could be a terribly complicated drawback, over one Palm could seem in Associate in Nursing image; lighting condition could vary tremendously; facial expressions conjointly vary from time to time; faces could seem at completely different scales, positions and orientations;The diagram of Palm Recognition is shown in figure(3).

Further, reckoning on the applying, handling options over time (e.g., aging) may additionally be needed. Given a Palm image to be recognized, the amount of people to be matched against is a crucial issue.This brings up the notion of Palm recognition versus verification: given a Palm image, a recognition system should offer the proper label (e.g., name label) related to that Palm from all the people in its information. A Palm verification system simply decides if Associate in Nursing input Palm image is related to a given Palm image. Since Palm recognition during a general setting is incredibly troublesome, Associate in Nursing application system generally restricts one amongst

several aspects, as well as the setting within which the popularity system can ensue (fixed location, fastened lighting, uniform background, single face, etc.), the allowable Palm amendment (neutral expression, negligible aging, etc.), the amount of people to be matched against, and also the reading condition (front view, no occlusion, etc.).

C. Palm Detection

Palm Detection could be a a part of a large space of pattern Detection technology. Detection and particularly Palm Detection covers a variety of activities from several walks of life. Palm Detection are some things that humans area unit significantly sensible at and science and technology have brought several similar tasks to America. Palm Detection generally and also the Detection of moving folks in natural scenes above all, need a collection of visual tasks to be performed robustly. That method includes in the main threetask acquisition, social control and Detection. By the term acquisition we have a tendency to mean the detection and chase of face-like image patches during a dynamic scene. social control is that the segmentation, alignment and social control of the Palm pictures and eventually Detection that's the illustration and modelling of Palm pictures as identities, and also the association of novel Palm pictures with noted models.

D. Algorithms and strategies

One of the foremost difficult issues Palm recognition deals with is Associate in Nursing acceptable separation of the info that belong to a similar category. In Palm recognition, a category represents all knowledge of a similar subject, ie, all pictures of a similar person. The goal is to implement an automatic machine supported system that (after format and coaching by sampling of pictures) acknowledges person's identity within the images that weren't trained before. this will have numerous sensible applications like machine-controlled person identification, recognition of race, gender, emotion, age etc. the realm of Palm recognition is well developed victimisation

E(a). Support Vector Machines

SVM map data from an original space into a higher dimensional feature space using non-linear mapping.An original algorithm from the original space is used in the feature space. Although the high-dimensional space increases the difficulty of the problem (curse of dimensionality),a trick for computing the scalar products in the feature space exists. Computation of the scalar product between two feature space vectors can be done using kernel functions. Using kernel functions, the feature space need not be computed explicitly. The SVM method was originally developed as a linear classifier. Later it was modified utilizing kernel methods so that it allows also non-linear mapping of data to the feature space. maximizes the margin of the data sets. The margin is defined as the minimal distance of a sample to the decision surPalm . The distance of the decision surPalm from the nearest appearance of the individual data sets should be as large as possible. The dashed lines that are parallel with the hyper plane contain support vectors.

E(b). .Principle Component Analysis

Principal Component Analysis (PCA) is a dimensionality reduction technique which is used for compression and recognition problems. It is also known as Eigen space Projection or Karhunen-Loeve Transformation. PCA projects images into a subspace such that the first orthogonal dimension of this subspace captures the greatest amount of variance among the images and the last dimension of this subspace captures the least amount of variance among the images. The main goal of PCA is the dimensionality reduction, therefore the eigenvectors of the covariance matrix should be found in order to reach the solution. The eigen vectors correspond to the directions of the principal components of the original

data, the statistical significance is given by their corresponding eigen values.

E(c). Linear Discriminant Analysis

LDA creates a linear combination of independent features which yields the largest mean differences between the desired classes. The basic idea of LDA is to find a linear transformation such that feature clusters are most separable after the transformation which can beachieved through scatter matrix analysis . The goal of LDA is to maximize the betweenclass scatter matrix measure while minimizing the within-class scatter matrix measure .

E(d). Eigen Palm

Human Palm Detection is a very difficult and practical problem in the field of pattern Detection. On the foundation of the analysis of the present methods on human Palm Detection, a new technique of image feature extraction is presented. And combined with the artificial neural network, a new method on human Palm Detection is brought up. By extraction the sample pattern's algebraic feature, the human Palm image's eigen values, the neural network classifier is trained for Detection. The Kohonen network we adopted can adaptively modify its bottom up weights in the course of learning. Experimental results show that this method not only utilises the feature aspect of eigen values but also has the learning ability of neural network. It has better discriminate ability compared with the nearest classifier. The method this paper focused on has wide application area. The adaptive neural network classifier can be used in other tasks of pattern Detection.

In order to calculate the eigen faces and eigenvalues in MATLAB we have to use the command eig. The syntax of the command is d = eig (A) V,D = eig (A) V,D = eig (A,'nobalance') d = eig (A,B) V,D = eig (A,B)

E(e). Euclidean Distance

One of the ideas on which Palm Detection is based is the distance measures, between to points. The problem of finding the distance between two or more point of a set is defined as the Euclidean distance. The Euclidean distance is usually referred to the closest distance between two or more points.

IV. LINEAR DISCRIMINANT ALGORITHM

Linear Discriminant analysis explicitly attempts to model the difference between the classes of data. LDA is a powerful Palm recognition technique that overcomes the limitation of Principle component analysis technique by applying the linear discriminant criterion. This criterion tries to maximize the ratio ofthe determinant of the between-class scatter matrix of the projected samples to the determinant of the within class scatter matrix of the projected samples.

Linear discriminant group images of the same class and separates images of different classes of the images. Discriminant analysis can be used only for classification not for regression. The target variable may have two or more categories.

Images are projected from two dimensional spaces to c dimensional space, where c is the number of classes of the images. To identify an input test image, the projected test image is compared to each projected training image, and the test image is identified as the closest training image. The LDA method tries to find the subspace that discriminates different Palm classes .

The within-class scatter matrix is also called intra personal means variation in appearance of the same individual due to different lighting and Palm expression. The betweenclass scatter matrix also called the extra personal represents variation in

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appearance due to difference in identity. Linear discriminant methods group images of the same classes and separates images of the different classes.

To identify an input test image, the projected test image is compared to each projected training image, and the test image is identified as the closest training image. To explain discriminant analysis, here we consider a classification involving two target categories and two predictor variables. The following figure shows a plot of the two categories with the two predictor's orthogonal axes:

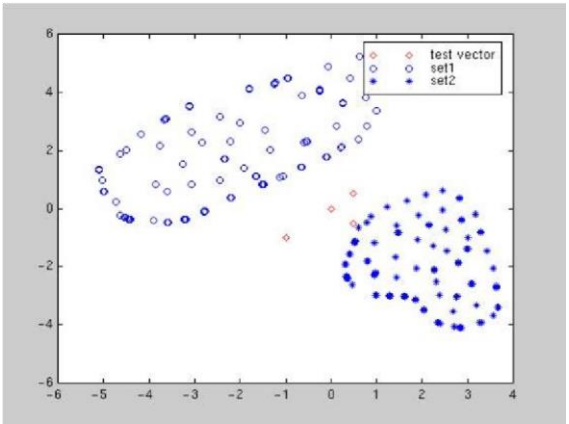

Figure 4. Plot of two categories of classes

Linear discriminant analysis finds a linear transformation (discriminant function) of the two predictors, X and Y that yields a new set of transformed values that provides a more accurate discrimination than either predictor alone: Transformed Target = C1*X + C2*Y The following figure shows the partitioning done using the transformation function:

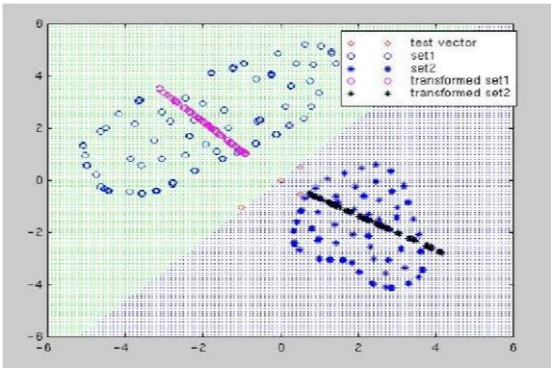

Figure 5. Partitioning done using the transformation function

Maximizing the between class scatter matrix, while minimizing the within-class scatter matrix, a transformation function is found that maximizes the ratio of between-class variance to within-class variance and find a good class separation as illustrated as follows:

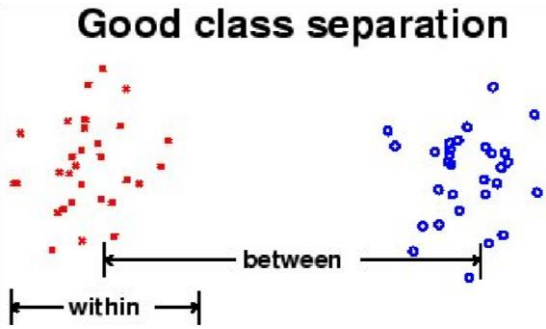

Figure 6. Class Separations in LDA.

A. totally different Approaches to LDA

Data sets will be remodeled and check vectors will be knowledge within the remodeled area by 2 totally different approaches.

Class-dependent transformation: this sort of approach involves increasing the quantitative relation of between category variance to at intervals category variance. the most objective is to maximise this quantitative relation so adequate category disjuncture is obtained. The class-specific sort approach involves

victimisation 2 optimizing criteria for reworking the information sets severally.

Class-independent transformation: This approach involves increasing the quantitative relation of overall variance to at intervals category variance. This approach uses only 1 optimizing criterion rework|to rework|to remodel} {the knowledge |the info |the information} sets and therefore all data points no matter their category identity are remodeled victimisation this transform. during this kind of LDA, every category is taken into account as a separate category against all different categories.

B. Steps utilized in LDA

In Linear discriminant analysis we offer the subsequent steps to discriminant the input images:

Step-1:

We need a training set composed of a comparatively massive cluster of subjects with various facial characteristics. the suitable choice of the training set directly determines the validity of the ultimate results. The information ought to contain many samples of Palm pictures for every subject within the coaching set and a minimum of one example within the check set. These examples ought to represent totally different frontal views of subjects with minor variations visible angle. they must additionally embody totally different facial expressions, totally different lighting and background conditions, and examples with and while not glasses. it's assumed that each one pictures ar already normalized to m × n arrays which they contain solely the Palm regions and not a lot of of the subjects' bodies.

Step-2

For each image and sub image, beginning with the 2 dimensional m × n array of intensity values I(x, y),we construct the vector enlargement enlargement m×n. This vector corresponds to the initial illustration of the face. therefore the set of all faces within the feature area is treated as a highdimensional vector area.

Step-3

By process all instances of an equivalent person's Palm as being in one category and also the faces of various subjects as being in several categories for all subjects within the coaching set, we tend to establish a framework for acting a cluster separation analysis within the feature area. Also, having labeled all instances within the training set and having outlined all the categories, we tend to cipher the within-class and between-class scatter matrices. currently with-in category scatter matrix 'S' and also the between category scatter matrix 'Sbw' ar outlined as follows:

Where , Γij, the ith samples of sophistication j, μ is that the mean of sophistication j, c is that the range of categories, nj is that the range of samples in class j.

Where, μ represents the mean of all categories.

Then the mathematical space for LDA is spanned by a group of vectors W=[W1 , W2, ….., Wd] , Satisfying

Palm pictures ought to be distributed closely with-in categories and will be separated between categories, the maximum amount as attainable. In different words, these discriminant vectors minimize the denominator and maximize the dividend in equation (3). we will so be made by the Manfred Eigen vectors of Sw-1 S.

LDA tries to discriminant the input file by dimension reduction.

V. MATHEMATICAL OPERATIONS

In this section, the mathematical operations concerned in using LDA are going to be analyzed the help of sample set in Figure two. For easy understanding, this idea is applied to a two-class downside. every knowledge set has a hundred 2-D knowledge points. Note that the mathematical formulation of this classification strategy parallels the Matlab implementation related to this work.

Step 1

Formulate the information sets and also the check sets, that ar to be knowledge within the original area. The given knowledge sets and also the check vectors ar developed, a graphical plot of the information sets and check vectors for the instance thought of in original area is shown in Figure two. For easy understanding allow us to represent the information sets as a matrix consisting of options within the kind given below:

Step 2

Compute the mean of every knowledge set and mean of entire knowledge set. Let and be the mean of set one and set two severally and be mean of entire knowledge, that is obtained by merging set one and set two, is given by Equation one.

where P1 and P2 are the apriori chances of the categories. within the case of this simple 2 category downside, the likelihood issue is assumed to be zero.5.

Step 3

In LDA, within-class and between-class scatter are accustomed formulate criteria for sophistication separability. Within-class scatter is that the expected variance of every of the categories. The scatter measures ar computed using Equations three and four.

All the variance matrices ar symmetrical . Let cov1 and cov2 be the variance of set one andset two respectively. variance matrix is computed using the subsequent equation.

Note that Sb will be thought of because the variance of information set whose members ar the meanvectors of every category. As defined earlier, the optimizing criterion in LDA is that the quantitative relation ofbetween-class scatter to the within-class scatter. the answer obtained by increasing thiscriterion defines the axes of the remodeled area. but for the class-dependent transformthe optimizing criterion is computed using equations (5) and (6). It ought to be noted that if theLDA may be a category dependent sort, for L-class L separate optimizing criterion ar needed for every category. The optimizing factors just in case of sophistication dependent sort ar computed as

Step 4

By definition, Associate in Nursing Manfred Eigen vector of a change represents a 1-D invariant {subspace |mathematical area| topological space} of the Vector space within which the transformation is applied. a group of those Manfred Eigen vectors whose corresponding Manfred Eigen values ar non-zero are all linearly freelance and are invariant under the transformation. There fore any vector area will be delineate in terms of linear mixtures of the Manfred Eigen vectors. A linear dependency between options is indicated by a zero Manfred Eigen price. to get a non-redundant set of options all Manfred Eigen vectors admire non-zero Manfred Eigen values solely are thought of and also the ones admire zero Manfred

Eigen values are neglected In the case of LDA, the transformations are found because the eigen vector matrix of the various criteria defined in Equations 7 and 8.

Step 5

For any L-class drawback we'd continuously have L-1 non-zero Manfred Eigen values. this can be attributed to the constraints on the mean vectors of the categories in Equation two. The Manfred Eigen vectors appreciate non-zero Manfred Eigen values for the definition of the transformation. For our 2-class example, Figures two and three show the direction of the significant Manfred Eigen vector on that there's most discrimination data. Having obtained the transformation matrices, we have a tendency to remodel the info sets using the one LDA remodel or the category the category that ever the case could also be.

From the figures it are often ascertained that, reworking the complete information set to 1 axis provides definite boundaries to classify the info. the choice region within the remodeled house could be a solid line separating the remodeled information sets. For the category dependent LDA, equally the take a look at vectors are remodeled and are information exploitation the geometer distance of the take a look at vectors from every category mean.

The two Figures four and five clearly illustrate the speculation of Linear Discriminant Analysis applied to a 2-class drawback. the first information sets are shown and also the same information sets once transformation are illustrated. it's quite clear from these figures that transformation provides a boundary for correct classification. during this example the categories were properly defined however cases where there is overlap between categories, getting a call region in original house are going to be terribly getting and in such cases transformation proves to be terribly essential. Transformation Once the transformations ar completed using the LDA transforms, euclidean distance or RMS distance is employed to classify information points. geometer distance is computed exploitation Equation eleven wherever μntrans is that the mean of the remodeled sets, n is that the category index and x is that the take a look at Vector. so for n categories, n euclidean distance ar obtained for every take a look at purpose.

Step7

The smallest geometer distance among the n distances categoryifies the take a look at vector as happiness to class n

A. Image acquisition

Image acquisition is essentially creation of info to feed into the system for training moreover as for testing and classification of pictures. we have a tendency to noninheritable our pictures on-line from varied sources.

B. Image pre-processing

For preprocessing the pictures ar born-again into 256x256 pixels and that is afterward remodeled into CIElab color house. The workplace color house describes mathematically all perceivable colours within the 3 dimensions L for lightness and a and b for the colour opponent’s green–red and blue–yellow.

C Image Segmentation

Image segmentation is that the partition of a picture into a group of non-overlapping regions whose union is that the entire image. within the simplest case, one on large steigen vector axis is that the best transformation. Figures half dozen and seven, are interesting in this they show fully enclosed by however the linear transformation method are often straightforward task to create it noted to a projecting computer what characteristics constitutes a ”meaningful” discriminating axes drawn by the Manfred Eigen vectors.

1. Classification based mostly

object region and a background region. A region can't be declared a section unless it's viewed as edge pixels. it's not a information points onto the maximally segmentation. For this reason, a group of rules normally segmentation procedures is required:

Step 6

would solely have AN

- Regions of a picture segmentation ought to be uniform and homogeneous with reference to some characteristic (eg gray level or texture).

- Region interiors ought to be straightforward and while not several holes.

- Adjacent regions of a segmentation ought to have considerably variable values with reference to the characteristic on that they're uniform.

- Boundaries of every section ought to be straightforward, not ragged, and should be spatially correct.

2. Region based mostly

3. Contour based mostly

Categories of image segmentation

Images of the Palm is of interest within the study of the many disorders. A review of a number of the present approaches within the tissue segmentation of pictures. we have a tendency to loosely divided current image segmentation algorithms into 3 categories:

PALM provides wealthy three-dimensional (3D) data regarding the soft tissue anatomy . It reveals fine details of anatomy, and nonetheless is noninvasive and doesn't need radiation like r rays. it's a extremely flexible technique wherever distinction between one tissue and another in a picture are often varied just by variable the means the image is created. for instance, by altering radio-frequency (RF) and gradient pulses, and by carefully selecting relaxation timings, it's doable to focus on completely different elements within the object being imaged and turn out high distinction pictures. The wealthy anatomy data provided by PALM has created it an essential tool for diagnosing in recent years Applications that use the morphologic contents of PALM often need segmentation of the image volume into tissue sorts. for instance, correct segmentation of PALM pictures. In multiple sclerosis, quantification of nervous tissue lesions is important for drug treatment assessment meter analysis of nervous tissue (GM), nervous tissue (WM) and humour (CSF) is very important to characterize morphological variations between subjects Such studies generally involve vast quantity of information. Currently, in several clinical studies segmentation continues to be in the main manual or powerfully supervised by an

individual's knowledgeable. the extent of operator direction impacts the performance of the segmentation methodology in terms of your time consumption, resulting in unfeasible procedures for big datasets. Manual segmentation additionally shows giant intra- and inter-observer variability, creating the segmentation unrepeatable and deteriorating the exactitude of the analysis of the segmentation. Hence, there's a true would like for machine-driven PALM segmentation tools.

The automatic segmentation of PALM pictures has been an area of intense study. However, this task has proved problematic, thanks to the numerous artifacts within the imaging method. a number of this approaches within the tissue segmentation of PALM pictures. we offer a mathematical formulation of the PALM segmentation drawback, and an outline of assorted PALM segmentation ways, that we've got generally divided into 3 categories:

classification-based, region-based, and contour-based

Classification-Based Segmentation

In classification-based segmentation, voxels area unit categoryified and labeled as belonging to a specific tissue class in line with a particular criterion. the best technique is predicated on thresholding. Thresholding algorithmic rule tries to work out a threshold worth that separates the required categories. unvaried thresholding accustomed distinguish brain tissues from others in axial PALM slices. beginning at set values, thresholds for the head and also the palm area unit then iteratively adjusted supported the geometry of ensuing masks. though thresholding algorithmic rule is easy and computationally in no time, it's terribly sensitive to INU artifact and noise in

PALM pictures. the automated determination of an acceptable threshold could be problematic if there's severe overlap between the intensities of various tissue sorts thanks to noise and intensity inhomogeneities.

Instead of mistreatment easy thresholding in earlier classification-based segmentation work, applied math classification based mostly segmentation has been the tactic of alternative in additional recent time. applied math classification has the advantage of being additional sturdy, in addition as having a rigorous mathematical foundation in random theory. In applied math classification ways, the chance density operate of tissue intensity for various tissue categories area unit usually shapely parametrically as a combination of Gaussians, sometimes one gaussian operate per tissue category. so as to include native discourse data, PALM regularization is commonly used in addition. The bias field estimation drawback is forged in an exceedingly

Bayesian framework and also the expectationmaximization (EM) algorithmic rule is employed to estimate the unregularity and also the tissue categories. However, their methodology must be furnished with the tissue category conditional intensity models, that area unit generally made manually from coaching information. They conjointly failed to take into account neighborhood dependencies for the tissue segmentation. algorithmic rule by mistreatment PALM to introduce context or dependency among neighboring voxels. Propose to use a 3-step EM algorithmic rule, that interleaves voxel classification, category distribution parameter estimation, and bias field estimation. rather than mistreatment manually made tissue category conditional intensity models, their methodology employs digital brain atlas with a priori chance maps for every tissue category to mechanically construct intensity models for every individual scan being processed. The palm tissue categories area unit shapely as finite gaussian mixtures with MRF regularization to account for discourse data and also the bias field is shapely as a fourth order least sq. polynomial work. It conjointly use the mathematician mixture to model the 3 brain tissue categories. The biological variations of a specific tissue category area unit accounted for in their applied math model by

forward that the mean intensities of the tissue categories area unit slowly variable abstraction functions. The magnetic flux in homogeneities modify each the mean tissue intensities and also the noise variances in an exceedingly similar manner. To account for the smoothness and piecewise contiguous nature of the tissue regions, they use a 3D MRF as a previous. take into account the applied math segmentation of multispectral PALM image. In their work, the intensity distributions of the brain tissues area unit once more shapely as a combination of Gaussians. Another major category of voxel classification techniques uses clusteringbased methodology. cluster may be a fashionable unattended classification methodology and has found several applications in pattern classification and image segmentation. cluster algorithmic rule tries to categoryify a voxel to a tissue class by mistreatment the notion of similarity to the category.

Region-Based Segmentation

The shape of an object are often delineate in terms of its boundary or the region it occupies. Image region belonging to an object usually have homogenised

characteristics, e.g. similar in intensity or texture. Regionbased phaseation techniques plan to segment a picture by distinguishing the assorted homogenised regions that correspond to totally different objects in a picture. not like cluster ways, region-based ways expressly take into account abstraction interactions between neighboring voxels. In its simplest type, region growing ways sometimes begin by locating some seeds representing distinct regions within the image . The seeds area unit then adult till they eventually cowl the complete image. The region growing method is so ruled by a rule that describe the expansion mechanism and a rule that check the homogeneity of the regions at every growth step. Region growing technique has been applied to PALM segmentation. A semi-automatic, interactive PALM segmentation algorithm was developed that use easy region growing technique for lesion segmentation. In , an automatic statistical region growing algorithmic rule supported a sturdy estimation of native region mean and variance for each voxel on the image was projected for PALM segmentation. the most effective region growing parameters area unit mechanically found via the step-down of a price purposeful. moreover, relaxation labeling, region cacophonous , and strained region merging were accustomed improve the standard of the PALM segmentation. The determination of an acceptable region homogeneity criterion is a crucial think about region growing segmentation ways. However, such homogeneity criterion could also be tough to get a priori. an adaptative region growing methodology is projected wherever the homogeneity criterion is learned mechanically from characteristics of the region to be divided whereas sorting out the region.

Other region-based segmentation techniques,

1.Split-and-merge based segmentation and

2.Watershed based segmentation

have conjointly been projected for PALM segmentation..

1.Split-and-merge based segmentation

1.Split-and-merge primarily based segmentation

within the split-and-merge technique, a picture is initial split into several tiny regions throughout the cacophonous stage consistent with a rule, so the regions ar merged if they're similar enough to supply the ultimate segmentation.

2.Watershed-based segmentation

In the watershed-based segmentation, the gradient magnitude image is taken into account as a topographic relief wherever the brightness price of every voxel corresponds to a physical elevation. associate immersion primarily based approach is employed to calculate the watersheds. The operation may be represented by imagine that holes ar perforated in every native minimum of the topographical relief. Then, the surface is slowly

immersed in water, that causes a flooding of all the construction basins, ranging from the basin related to the world minimum. As before long as 2 catchment basins begin to merge, a dam is built. The procedure ends up in a partitioning of the image in several construction basins of that the borders outline the watersheds. to cut back over-segmentation, the image is ironed by 3D adaptative anisotropic diffusion before watershed operation. Semi-automatic merging of volume primitives came back by the watershed operation is then accustomed manufacture the ultimate segmentation.

Contour-Based Segmentation

Contour-based segmentation approach assumes that the various objects in a picture may be segmental by sleuthing their boundaries. Whereas region-based techniques arrange to take advantage of homogeneity properties inside regions in a picture, boundary-based techniques have faith in the gradient options close to associate object boundary as a guide. Hence, contourbased segmentation ways that have faith in sleuthing edges within the image is inherently a lot of susceptible to noise and image artifacts. subtle pre- and post-processing is commonly required to attain a satisfactory segmentation result.

Two styles of contour-based techniques :

Edge detection segmentation:

PALM image segmentation supported edge detection has been planned , wherever a mix of Marr-Hildreth operator for edge detection and morphological operations for the refinement of the detected edges is employed to phase 3D man pictures. A boundary tracing technique is planned, wherever the operator clicks a element in an exceedingly region to be printed and therefore the technique then finds the boundary ranging from that time. the strategy is, however, restricted to segmentation of enormous, well outlined structures, however to not distinguish fine tissue varieties. Edge-based segmentation ways typically suffer from over or under-segmentation, iatrogenic by improper threshold choice . additionally, the sides found ar typically not closed and complex edge linking techniques ar any needed.

Active contour primarily based segmentation:

Active contour deforms to suit the object's form by minimizing (among others) a gradient dependent attraction force whereas at a similar time maintaining the smoothness of the contour form. Thus, in contrast to edge detection, active contour ways ar way more sturdy to noise because the needs for contour smoothness and contour continuity act as a sort of regularization. Another advantage of this approach is that previous information concerning the object's form may be engineered into the contour parameterization method. However, active contour primarily based algorithms typically need format of the contour on the point of the article boundary for it to converge with success to verity boundary. a lot of significantly, active contour ways have problem handling deeply convoluted boundary like CSF, metric weight unit and WM boundaries thanks to their contour smoothness demand. Hence, they're usually not applicable for the segmentation of brain tissues. nonetheless, it's been applied with success to the segmentation of intracranial boundary , brain outer surface , and neuro-anatomic structures in pictures.

Feature Extraction

Feature extraction is finished once the preprocessing innovate character recognition system. the first task of pattern recognition is to require associate input pattern and properly assign it mutually of the attainable output categories. This method may be divided into 2 general stages: Feature choice and Classification. Feature choice is essential to the

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complete method since the classifier won't be ready to acknowledge from poorly designated options. Criteria to settle on options given by Lippman are: “Features ought to contain info needed to differentiate between categories, be insensitive to irrelevant variability within the input, and even be restricted in variety, to permit, economical computation of discriminant functions and to limit the number of coaching information required” Feature extraction is a vital step within the construction of any pattern categoryification and aims at the extraction of the relevant info that characterizes every class. during this method relevant options ar extracted from objects/ alphabets to make feature vectors. These feature vectors ar then utilized by classifiers to acknowledge the input unit with target output unit. It becomes easier for the classifier to classify between completely different categories by gazing these options because it permits fairly straightforward to differentiate. Feature extraction is that the method to retrieve the foremost necessary information from the data. Feature extraction is finding the set of parameter that outline the form of a personality exactly and unambiguously. In feature extraction part, every character is diagrammatical by a feature vector, that becomes its identity. the key goal of feature extraction is to extract a collection of options, that maximizes the popularity rate with the smallest {amount} amount of parts

and to get similar feature set for sort of instance of a similar image. The wide used feature extraction ways ar templet matching, Deformable templates, Unitary Image transforms, Graph description, Projection Histograms, Contour profiles, Zoning, Geometric moment invariants, Zernike Moments, Spline curve approximation, Fourier descriptors, Gradient feature and physicist options.

Importance of feature extraction

When the pre-processing and therefore the desired level of segmentation (line, word, character or symbol) has been achieved, some feature extraction technique is applied to the segments to get options, that is followed by application of classification and post process techniques. it's essential to concentrate on the feature extraction part because it has associate evident impact on the potency of the popularity system. Feature choice of a feature extraction technique is that the single most significant think about achieving high recognition performance. Feature extraction has been given as “extracting from the data info that's best suited for classification functions, whereas minimizing the inside category pattern variability,enhancing the between class pattern variability”. Thus, selection of a suitable feature extraction technique according to the input to be applied needs to be done with utmost care. Taking into consideration all these factors, it becomes essential to look at the various available techniques for feature extraction in a given domain, covering vast possibilities of cases.

LITERATURE SURVEY

1. *Palm vein recognition using a high dynamic range approach* ***Emanuela Piciucco ; Emanuele Maiorana ; Patrizio Campisi IEEE 2018.***

In this study, the authors propose a novel approach for palm vein recognition relying on high dynamic range (HDR) imaging. Specifically, the authors speculate that the exploitation of multiple-exposure vein images guarantees better recognition performance than a baseline system relying on single-exposure acquisitions. To verify the authors' assumptions, a multiple-exposure dataset is collected from 86 subjects, with 12 sets of palm vein images captured for each user. Each set is composed of five images, acquired at different exposures, which can be fused to generate a HDR representation of the actual vein pattern. Local binary pattern and local derivative pattern are employed to extract features from single-exposure images, raw HDR images, and tonemapped HDR images. The obtained experimental results show that significant performance improvement can be achieved when discriminative features are extracted from HDR contents, with respect to the use of single-exposure images.

2.Multibiometric Authentication System Using Slap Fingerprints, Palm Dorsal Vein, and Hand Geometry Puneet Gupta ; Phalguni Gupta IEEE 2018.

In this paper, a multibiometric system that fuses slap fingerprints, palm dorsal vein, and hand geometry for accurate person authentication is proposed. The proposed system simultaneously acquires slap images and infrared (IR) hand dorsal image from which slap fingerprints, palm dorsal veins, and IR hand geometry are extracted. Simultaneous acquisition reduces the acquisition time and helps to improve user acceptability. The slap

segmentation is accomplished using the knowledge of the approximate finger location and hand type (either left or right) obtained from the simultaneously acquired IR hand dorsal image. Multibiometric fusion based on serial methodology has been proposed for consolidating the matching scores of slap fingerprints, palm dorsal vein, and IR hand geometry. It ensures better performance in terms of accuracy and time. Experimental results indicate that authentication using slap fingerprints can be improved by incorporating the knowledge from IR hand images. Further, it depicts that the fusion of slap fingerprint, palm dorsal vein, and IR hand geometry can help to achieve the best performance.

3.A Low-Cost Optical Sensor for Secured Antispoof Touchless Palm Print Biometry ***Amit Chatterjee ; Puneet Singh ; Vimal Bhatia ; Shashi Prakash IEEE 2018.***

Conventional biometric spoof detection sensors suffer from several problems, including complex expensive sensor assembly and design. They are susceptible to environmental perturbation and are not robust against all types of spoof attacks. Further, for a secured biometric sensor, the hierarchy of spoofing attempts (i.e., curious attempts, low-level attack, and high-level attack) needs to be precisely distinguished to perform different actions (e.g., a high-level attack should be handled carefully). In this article, we propose a novel threelevel antispoof palm print biometric sensor using low-cost components and simple optical techniques (photography, fringe projection, and biospeckle analysis). At the first level, to eliminate the curious futile users, a 2-D image of the palm print is captured, and feature matching is performed. Next, the most prevalent low-level attacks (photo and layered attacks) are detected using fringe projection profilometry. At the final level, a novel biospeckle index based on a subtraction average technique is introduced to quantify the liveliness map for eliminating the high-level attacks, including fake prints and cadavers. The robustness of the biospeckle analysis against different possibilities to generate false activity (tremor, air flow, and heat flow) has also been verified.

4.A Robust and Secure Palm Vessel Biometric Sensing System Based on Photoacoustics Yuehang Wang ; Zhengxiong Li ; Tri Vu ; Nikhila Nyayapathi ; Kwang W. Oh ; Wenyao Xu ; Jun Xia ***IEEE 2018.***

In this paper, we propose a new palm vessel biometric sensing system based on photoacoustic imaging, which is an emerging technique that allows high-resolution visualization of optical absorption in deep tissue. Our system consists of an ultrasound (US) linear transducer array, an US data acquisition system, and an Nd:YAG laser emitting 1064-nm wavelength. By scanning the array, we could get a 3-D image of palm vasculature. The 3-D image is further combined with our newly developed algorithm, Earth Mover's Distance-Radiographic Testing, to provide precise matching and robust recognition rate. Compared to conventional vein sensing techniques, our system demonstrates deeper imaging depth and better spatial resolution, offering securer biometric features to fight against counterfeits. In this paper, we imaged 20 different hands at various poses and quantified our system performance. We found that the usability and accuracy of our system are comparable to conventional biometric techniques, such as fingerprint

imaging and face identification. Our technique can open up avenues for better liveness detection and biometric measurements.

5.Finger Vein Presentation Attack Detection Using Total Variation Decomposition Xinwei Qiu ; Wenxiong Kang ; Senping Tian ; Wei Jia ; Zhixing Huang IEEE 2018.

Finger vein recognition is an emerging biometric technique for personal authentication that has garnered considerable attention in the past decade. Although shown to be effective, recent studies have revealed that finger vein biometrics is also vulnerable to presentation attacks, i.e., printed versions of authorized individual finger vein images can be used to gain access to facilities or services. In this paper, given that both blurriness and the noise distribution are slightly different between real and forged finger vein images, we propose an efficient and robust method for detecting presentation attacks that use forged finger vein images (print artifacts). First, we use total variation regularization to decompose original finger vein images into structure and noise components, which represent the degrees of blurriness and the noise distribution. Second, a block local binary pattern descriptor is used to encode both structure and noise information in the decomposed components. Finally, we use a cascaded support vector machine model for classification, by which finger vein presentation attacks can be effectively detected. To evaluate the performance of our approach, we constructed a new finger vein presentation attack database. Extensive experimental results gleaned from the two finger vein presentation attack databases and a palm vein presentation attack database show that our method clearly outperforms stateof-the-art methods.

6.Microsoft's Kinect Technology: A Bust That Could Still Become a Boom Arunasalam Sambhanthan IEEE 2018.

Microsoft's Kinect wrist-worn sensor technology is capable of interpreting a user's wrist, palm, and finger motions [1] to control a computer or console. The infrared laser device sends messages to mobile phones and iPads to decode human body movements, resulting in the manipulation of digital files based solely on gestures [2]. This motion-controlled computing has the potential to reduce redundancies and workload blockages in offices.

7.Dynamic ROI extraction method for hand vein images Wafa Damak ; Randa Boukhris Trabelsi ; Masmoudi Alima Damak ; Dorra Sellami IEEE 2018.

The region of interest (ROI) extraction is important in hand vein recognition system. The main challenges for accurate extraction of the vein region are to overcome variability in hand size, lighting conditions, orientation, appearance, noisy background, and non-uniform grey levels in foreground region. Here, we propose a new dynamic

hand vein ROI extraction, preserving the whole vein area. A hand segmentation process robust to the mentioned challenges, contributing to an accurate definition of hand edge delimitations is proposed. Our approach is validated on both dorsal vein Bosphorus database and palm vein Vera database. Our proposed method accuracy is ~98% for Bosphorus database and 90% for Vera database. To illustrate the efficiency of the proposed ROI extraction, we insert it as a first block in a hand vein recognition system. Then, a comparison study at system level with recent approaches is carried on, showing an improvement of the whole system area under the curve by a rate of 12% and 2% for Bosphorus and Vera databases, respectively. The speed performances demonstrate a mean run time of 0.73 s for Bosphorus database and 1.2 s for Vera database, proving that the proposed method can be conveniently used on a real-time application.

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TITLE

Cyst's 3D projection of sonomammogram using physical parameters - reflection coefficient and mass density in Phython

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ABSTRACT:

This paper deals with breast characterization in step with inner tissue characteristics in a current issue to help radioscopy in detecting carcinoma primarily. Discomfort carcinoma is due to its vital factor and it is also demonstrated in girls with impenetrable breast. Occurance of microcalcification at early stages by the caution of physical characteristics is through the work of an automatic algorithm. Compared to its lesion portion, the Sono mammogram image with its cyst base is considered to be bin twice. The minimum and maximum range of the mass density (0.92 to 1.14g/cm3) is searched out through the reflection co-efficient which is used to substantiate its micro-calcification. The reflection coefficient is

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Keywords: Feature Extraction, ultrasound, Cyst base, Lesion Part, Mass density, Reflection Coefficient, Region of intrest, Segmentation.

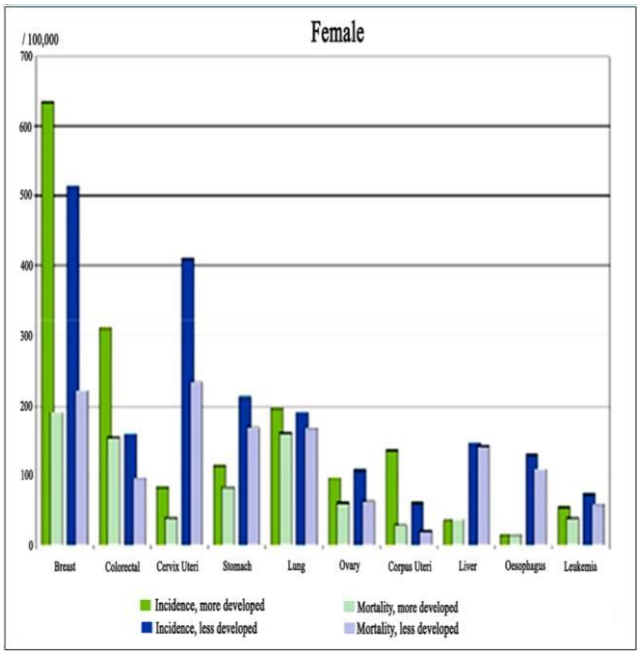
I. INTRODUCTION

Images can be processed using mathematical operations through a method called image processing. An image or a set of features or factors associated with the image is the output received when the input is a photograph or a video frame. Processing of the input image in order to fulfill the required application is another way of describing it. In most of the processing techniques of the image, the image is

handled as a two dimensional signal and the methods involved in it are typical signal processing methods. A two dimensional representation of a three dimensional scene in terms of f(x,y) ia referred to as an image.

The spatial co-ordinates are represented by (x,y). The amplitude of f at any point (x,y) is used to define the gray or intensity levels of image at a point. The image is referred to as digital image when the intensity values of f and the x, y are both discrete and uniform as well. Pixels are the finite number of elements present in the digital image. A particular location and value is provided by each pixel. When a digital image is manipulated by means of a processor, it is defined as digital image processing. The F(x, y) value of the pixel is changed through a digital computer through some function. Based on required application, this operation can be segregated into three groups.

Finding proper ways to mathematically describe and analyse images is the primary goal of this image



modelling or representation. We must understand that this may not be the best representation as there are various representations and thus different results as well. Wavelets and Multiresolution processing, Compression, Morphological processing, Segmentation, Representation and description, Image enhancement, Image recogonition, Image acquisition, Color Image processing, Image restoration and classification are the fundamental steps in image processing.

Breast cysts are non cancerous. They are the fluid filled sacs inside the breast. In one or more breasts there is a possibility of one or more breast cycts. When a cyst becomes large and some uneasiness is seen, then treatment is required otherwise this can be ignored. As a result of fluid accumulation in the glands in the breasts, there is a development of breast cysts.

Fig 1- Common cancers worldwide incidence and mortality statistics.

II. PROPOSED SYSTEM

For detecting abnormalities in cancer developed in the breast, various techniques are being used to find out the solution and thus the various image processing techniques are being in use. Rather than microcalcification based analysis, mass abnormalities is used. To detect and classify the exceptional growth, it has been observed that the analysis went to usual way. Image enhancement, Image restoration, segmentation and classification are the regular methods in use. SVM classifier and most probably based segmentation have been used to achieve the results. The interpretation of images is not perfect for doctors to analyse as the outputs through the existing algorithm have been given an ambiguous guess and interpolated in such a way. The early occurance of cyst can be detected by proposing a methodology for analysing sonomammogram images by calculating the physical characteristics of the corresponding input images. The algorithm is also very useful in finding the region of interest size. The size of the abnormalities can be easily measured through the 3d view part. The reflection co-efficient for the the lesion part of the image and the whole image can be calculated in an easy method. Both reflection energy as well as the reflection co-efficient are high in the lesion part and thus the ratio of amplitude of reflected wave to the incident wave gives the reflection co-efficient. The reflection co-efficient always lies between 0 and 1. 0 is the case of total transmission and 1 is the case of total reflection.

There are a lot of soft and fatty tissues in the breast. Calcium deposits in the breasts lead to cancer. When

ultrasound source comes in contact with the breast with such abnormality, the reflected energy is in the solid lesion portion. When there is a high reflected energy, the reflection co-efficient can be calculated for the whole image including the lesion part. If we analyse the matrix of the acquired image after the breast image is exposed to low dense ultra sound, we can observe brighter white spots with higher intensities in the affected regions. ROI segmentation is done as combining the reflection co-efficient's range as threshold and later using exact mapping. A segmented image of lesion is obtained by considering the range of reflection co-efficient as a threshold. ROI is thus calculated by using thresholding and exact mapping. The first step is calculating the mass density is by extracting the bright regions in a particular locality of appropriate size. Mapping between the mass density and the reflection co-efficient can be used as a tool for increasing the possibility in order to increase the accuracy of the predictability and detecting the lesion region.

Fig 2-Simple breast cyst

Fig 3- Flow chart

III. METHODOLOGY: Initially the doctor collects the digital ultrasound images for screening ultrasound(US). There are both normal as well as abnormal ultrasound images in the images received. The abnormal image category is

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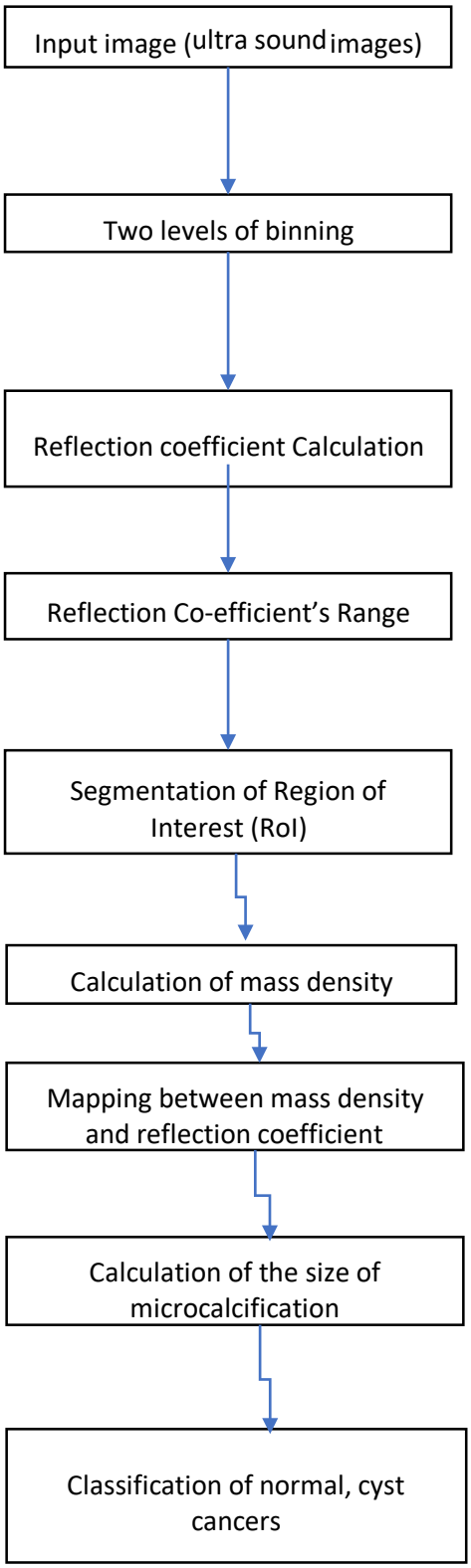

due to the images of the cyst cancer. The image sizes are measured in millimeter in terms of height and width. A red circle is used to highlight the intensities associated with the abnormal region and the ROI(Region of interest) which contains the bright white spots is the clustered microcalcification.

There are two levels of bining involved as well. The first level is where the entire sound image is binned initially with four columns and three rows. Matrix size of the bins are chosen with the following criteria. Equal sized bins are to be obtained. If the entire ultra sound is binned with more number of rows and columns, then there is a reduction in the size of the matrix as well as the individual bin. It may be distributed into more than one bin as per the characteristics of microcalcification. To obtain the size of the microcalcification, more than one level of bin needs to be analysed in the second level of binning. The size of the matrix and the individual bin become large if few rows and columns are used to bin the ultra sound. Thus along with microcalcification there may be a presence of an unwanted background. During the binning of the second level, it is represented in terms of distance as 23*15mm.

Classification of normal, cyst images is done based on mass density. The ratio of mass to volume is defined as mass density. It is possible to find mass deposit due to the hard calcium deposit. Calcium oxalate's mass density is 2.12g/cm3. The mass density of calcium deposition in calcium phosphate is 3.13g/cm3.

IV. RESULT AND DISCUSSION

These outputs are taken by following the methods illustrated in out proposed system. Each and every step in the proposed system has been followed and executed properly in order to get the outputs.

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Fig 4- INPUT IMAGE

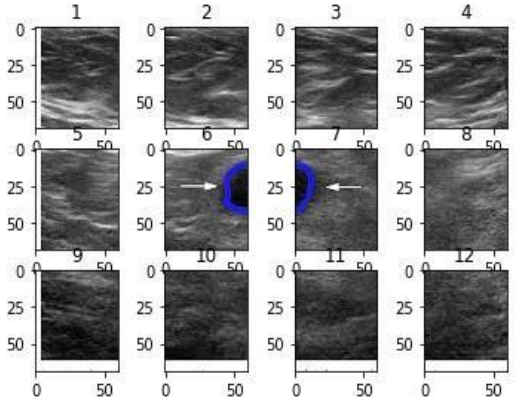

Fig 5- FIRST LEVEL BINNING

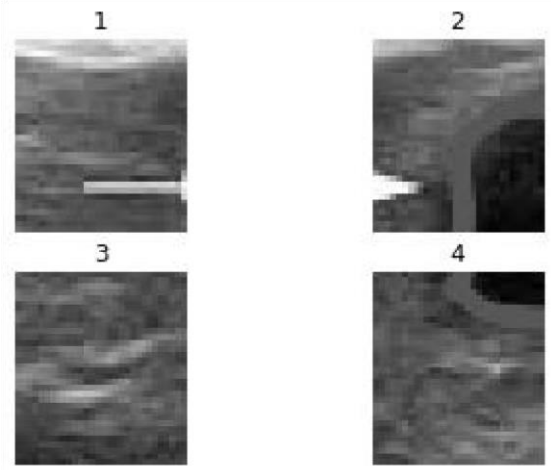

Fig 6- SECOND LEVEL BINNING

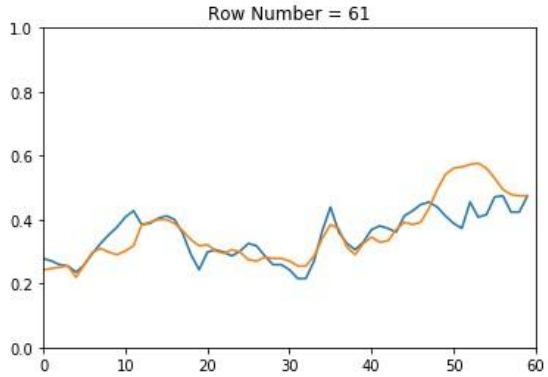

Fig 7-REFLECTION COEFFICIENT PLOT 61

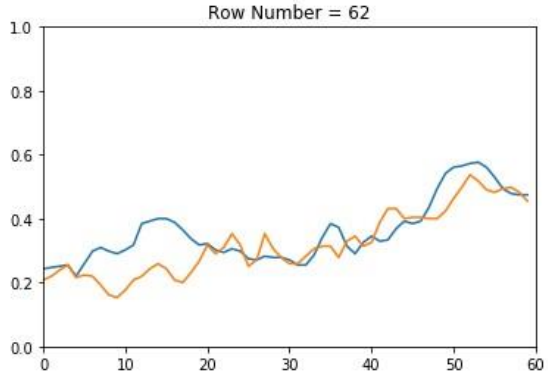

Fig 8- REFLECTION COEFFICIENT PLOT 62

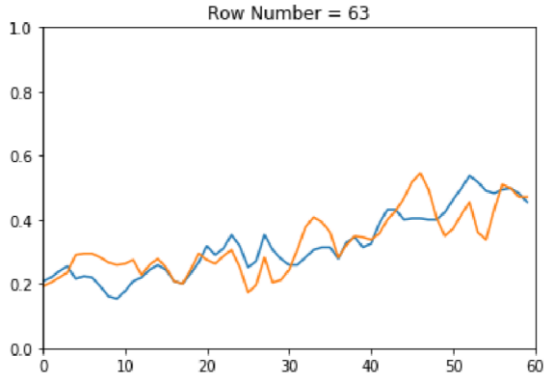

Fig 9 – REFLECTION COEFFICIENT PLOT 63

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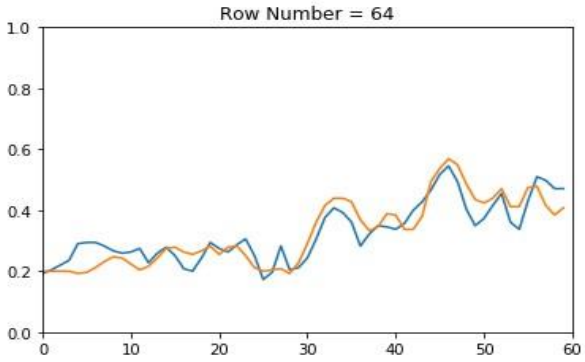

Fig 10 - REFLECTION COEFFICIENT PLOT 64

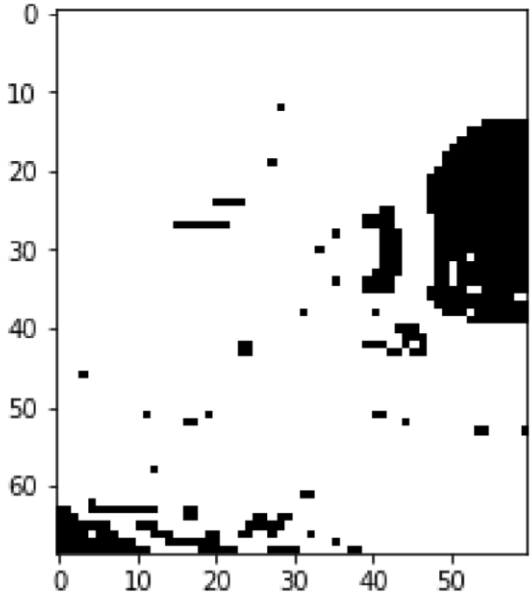

Fig 12 - Exact RoI by mapping

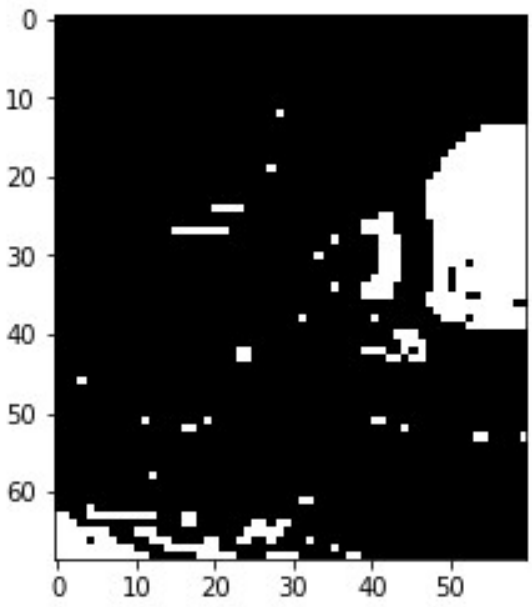

Fig 11 - Identifying the RoI by thresholding

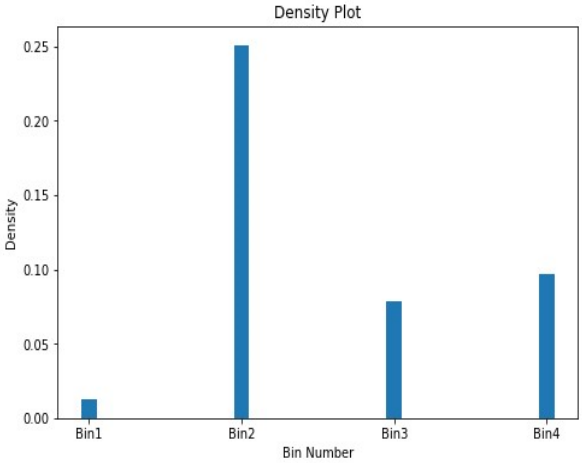

Fig 13 - Density plot

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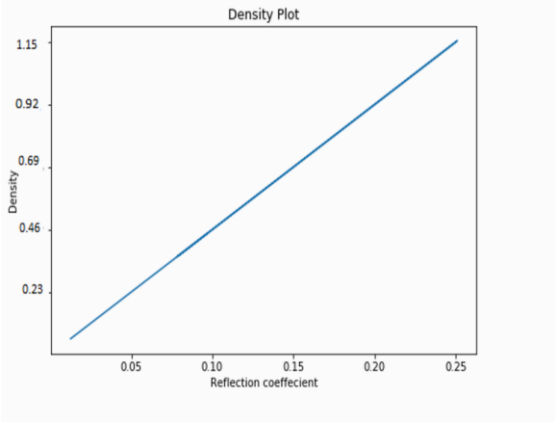

Fig 14-Reflection coefficient and mass density mapping

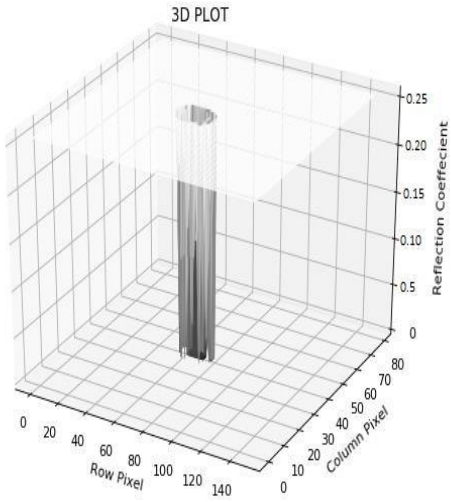

Fig 15- 3D plot

V. CONCLUSION

As discussed in the paper by using only two physical parameters, it is possible to project the region of intrest is projected in 3D view which will be more useful for the physician to analyze and predict about the diseased region further in an efficient way. This algorithm works effectively to segment the cyst with the help of reflection coefficient which has a range 0.02 to 0.225 and mass density measurement (0.92-1.14 g/cm3) which is a novel concept to increase true positive rate. As a future work, the RoI will be projected in 3D in terms of its size and it will be used to measure the cyst's size exactly .

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TITLE
OPTIMIZING ROAD TRAFFIC SYSTEM USING IoT SENSOR NETWORKS

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ABSTRACT:

In metropolitan cities, road traffic at the peak time is very high. The conventional automatic traffic signal in most of the signal crossing lane always shows “Green” even though there is no vehicle is crossed and it will create unnecessary traffic on the other side where the signal is to be turned green. This is because the traffic signal control works based on the timer which is predefined by the Traffic Management System.

The Proposed Intelligent Traffic Optimization System use piezoelectric sensors to monitor the non-traffic lane which is showing green signal and turn the signal automatically to red. Subsequently, it recognize heavy traffic lane and turn to green. It helps to make the smooth movement of vehicle in all the lanes without any traffic congestion in that location. It will make the vehicles to pass the signal without waiting for a long time. It will also guide pedestrians to cross the lane with correct signal indication.

Keywords -Road Traffic Optimization – Peizoelectric Sensor – IoT

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ABSTRACT

In metropolitan cities, road traffic at the peak time is very high. The conventional automatic traffic signal in most of the signal crossing lane always shows "Green" even though there is no vehicle is crossed and it will create unnecessary traffic on the other side where the signal is to be turned green. This is because the traffic signal control works based on the timer which is predefined by the Traffic Management System.

The Proposed Intelligent Traffic Optimization System use piezoelectric sensors to monitor the non-traffic lane which is showing green signal and turn the signal automatically to red. Subsequently, it recognize heavy traffic lane and turn to green. It helps to make the smooth movement of vehicle in all the lanes without any traffic congestion in that location. It will make the vehicles to pass the signal without waiting for a long time. It will also guide pedestrians to cross the lane with correct signal indication.

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Introduction:

In Modern era the vehicular population increases which raises the need for efficient Traffic Management system. The Traffic Management system is the one which analyze the traffic, cause for traffic congestion and find the best traffic infrastructure which support the changing traffic. Many researchers have carried out various researches to develop an intelligent Traffic Management system by considering various factors.

US department of Transportation states that transport congestion have three sources that is traffic influencing events, traffic demand and traffic infrastructure. Normally Traffic Management system mainly focuses on reducing traffic congestion thereby increasing the traffic efficiency.

Traffic Management system works based on the integrated information received from sensors, traffic lights, communication systems, etc.,

The underline concept of Real Time Intelligent transportation System is Internet of Things (IoT). IoT is nothing but connecting things via internet. Every device have a unique identification so that it can be located and connected. In the Real time transportation system the different sensors can be depending upon the parameters needed to measure.

The information for Traffic Management system may collect from the sensors placed on the roadside which gives information about the speed of the vehicle or traffic flow.

Mainly traffic is a major concern in the cities where mobile population is high because people mainly depend on the road transportation. The Road Traffic Optimization System can be implemented on major city junctions where the lanes from the four or more different directions join together. It helps to reduce the traffic congestion and identifies the lane which requires green signal for proceeding. It can be implemented in any road traffic signals.

Various factors can be considered for Optimization of Real Time Transportation system. This paper focuses on the review of Piezo electric sensors characteristics and its contribution in the optimization of Transport system.

PRIOR ART

The piezoelectric sensor is a new axle detection sensor used for health monitoring and road traffic monitoring. In road traffic monitoring, it provides accurate details about the number and classification of vehicles passing on the road. It is very much suitable for concrete structures and provides good performance compared to other techniques of road traffic monitoring [1].

Most of the techniques adopted for road traffic monitoring pavement damage at the time of installation and also fails to provide an accurate classification particularly for class 1 motorcycles.

The piezoelectric sensor is placed diagonally across the traffic lane. Therefore installation becomes easy and it also provides accurate details particularly about class 1 motorcycles [2].

The piezoelectric sensors classify the moving object based on their velocity, tire configuration and movement direction. It is used in airport surface movement control [3]. PZT piezoelectric ceramic is used as the sensing element and as mixture element in Cement-based sensors. It determines the number and classification of vehicles passing the road [4]. Wang Lijing et al show how the sensors and actuators are integrated using single piezoelectric element. Integrated sensor-actuator was simulated using 3D finite element model [5].

The data collected using the sensors are analyzed using deep learning algorithms [6] and security of this data is enhanced by various methods [7].

HIGHLIGHTS OF THE RESEARCH WORK

1. Piezoelectric Sensor is used for controlling the change of traffic signal.
2. Traffic signal is optimized and therefore it reduces the time taken by the vehicles to cross the signal.
3. It is an hybrid system with automatic timer and piezoelectric sensor.
4. It gives equal opportunity for all vehicles to cross the signal efficiently.
5. Pedestrian Crossing is facilitated by optimizing the signal change.

PROPOSED SYSTEM:

The Proposed Intelligent Traffic Optimization System use piezoelectric sensors to monitor the non-traffic lane which is showing green signal and turn the signal automatically to red. Subsequently, it recognize heavy traffic lane and turn to green. It helps to make the smooth movement of vehicle in all the lanes without any traffic congestion in that location. It will make the vehicles to pass the signal without waiting for a long time. It will also guide pedestrians to cross the lane with correct signal indication.

In highly traffic-congested cities, the road traffic system still works based on the timer system either automatically or manually. In such system, there are many occasions in which there may be no vehicle passing by or awaiting but the signal is at green for that lane. Similarly, there

may be a lot of vehicles on one lane to cross the signal path waiting on the lane due to red signal. To solve this problem, the count of vehicles on each can be considered as criteria for optimizing the signal.

Highway roads will have continuous heavy traffic during peak hours. So the count of vehicles cannot be considered as the primary criteria for changing the traffic signal. If the number of vehicles alone is considered for changing the signal, then the less-traffic lanes might suffer from starvation. Therefore, to avoid such situation, the threshold level value for each lane must be set.

If less-traffic gets minimum threshold value, then it must be given access to cross the signal path. If less-traffic lane is also frequently getting traffic during peak hours, then it is difficult to setup the above criteria. Because all the lanes whether highway or less-traffic lane, they will always exceed minimum threshold value. In that case, timer system will be followed. Therefore, the traffic system is optimized with the timer, sensor and communication module for sending data or storing data.Fig.1 & Fig.2 shows the block diagram and circuit diagram of the proposed system.

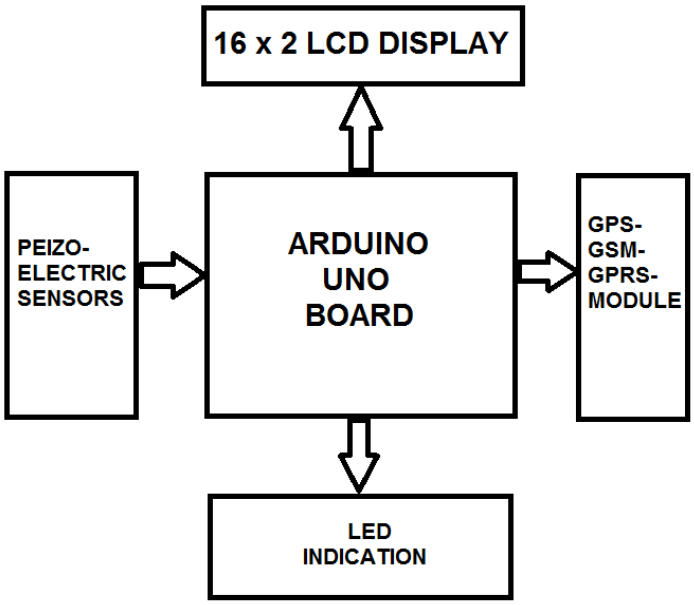

Fig.1 Block diagram of Intelligent Traffic Optimization Systen

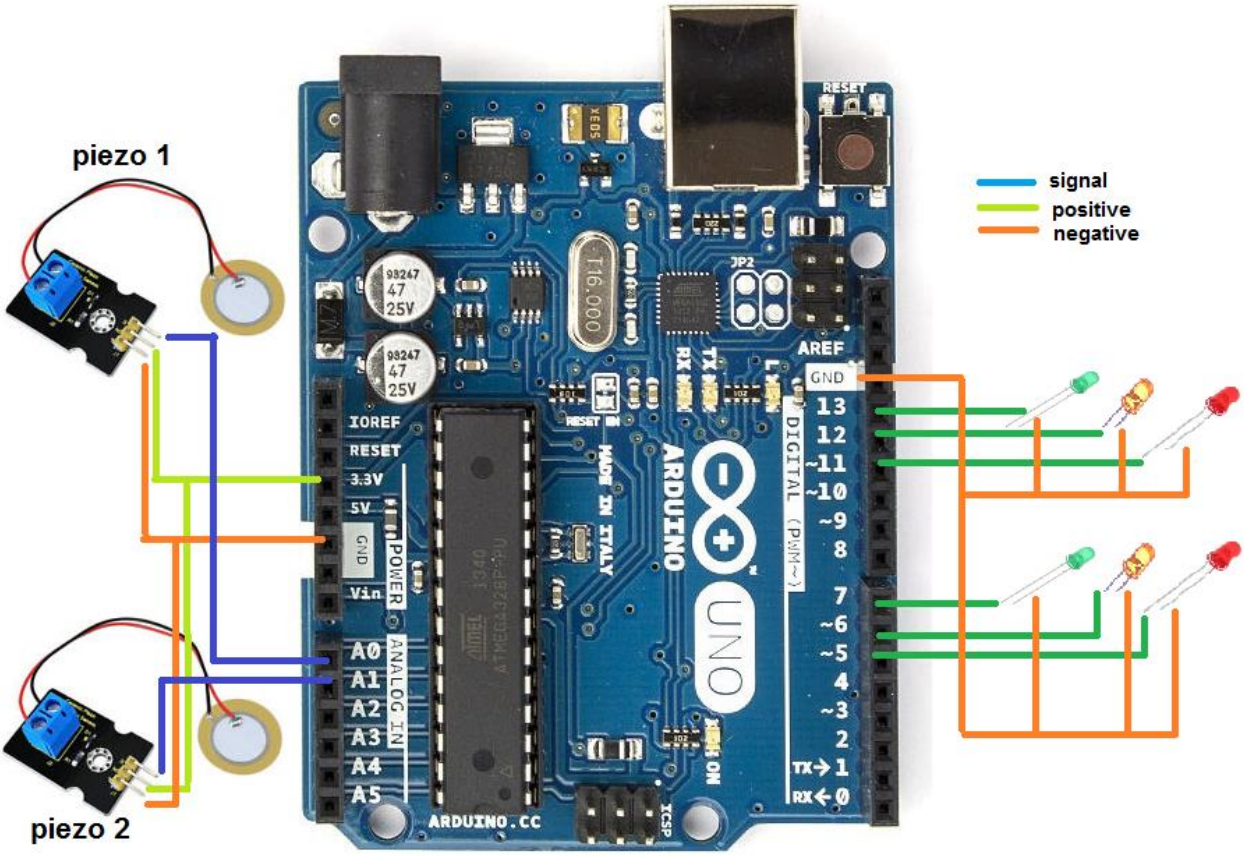

Fig.2. Circuit Connections in the Proposed System

CONCLUSION:

The Traffic Optimization System is very much useful in regulating the traffic flow particularly in main signal crossings. It reduces the time taken for crossing the signal by avoiding unnecessary waiting time. The traffic lanes with more traffic get more priority. It enables the vehicle to pass through the signal quickly. The implementation cost of this method is also low. As the piezoelectric sensors are installed on the groove cut on the road, this method provides permanent and dynamic solution.

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TITLE

ELECTROCHEMICAL SENSORS USING CNT'S –REVIEW

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ABSTRACT:
The Carbon Nano-tubes are used as biosensor due to their ultra-sensitive and ultra-fast sensing nature. The CNTs exhibit excellent mechanical, electrical and electro chemical properties due the above reasons they got a stimulated interest in the application of CNTs in biosensors. This review on recent research in field of CNTs based biosensors. The structure, functions, and their properties. This review highlights of different methods in which CNTs are prepared for the use of biosensors and in addition future research and development in CNTs based biosensor in the field of medical science. CNTs paly's important role in the electrochemical biosensors, immune-sensors, and DNA biosensors. Here we discusses about the factors effects the practical use of CNTs as biosensors. After an overview on CNTs based biosensors and their structures and properties we summarize the application of CNT based electrochemical sensors and biosensors.

KEY WORDS: Carbon Nano-tubes; Electro-chemical biosensors.

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Abstract: The Carbon Nano-tubes are used as biosensor due to their ultra-sensitive and ultra-fast sensing nature. The CNTs exhibit excellent mechanical, electrical and electro chemical properties due the above reasons they got a stimulated interest in the application of CNTs in biosensors. This review on recent research in field of CNTs based biosensors. The structure, functions, and their properties. This review highlights of different methods in which CNTs are prepared for the use of biosensors and in addition future research and development in CNTs based biosensor in the field of medical science. CNTs paly's important role in the electrochemical biosensors, immune-sensors, and DNA biosensors. Here we discusses about the factors effects the practical use of CNTs as biosensors. After an overview on CNTs based biosensors and their structures and properties we summarize the application of CNT based electrochemical sensors and biosensors.

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INTRODUCTION: Sensors are a class of devices used for detecting of variable quantity, real time tracking of chemical signals in biological cells. In general a sensor comprises of an active sensing element, signal transducer. The sensors are classified under the type of energy transfer they are thermal, electromagnetic, mechanical, and electro-chemical sensors. Were as the most important aspect of the sensor are sensitivity, selectivity, and stability. Among this the above different types electro-chemical sensors are the most promising analytical methods due their high rate selectivity and sensitivity. The sensing element is responsible for its selective detection of analyte and signal transducer converts a chemical event into appropriate signal that can be used with amplification or without it. The biosensors are first reported in

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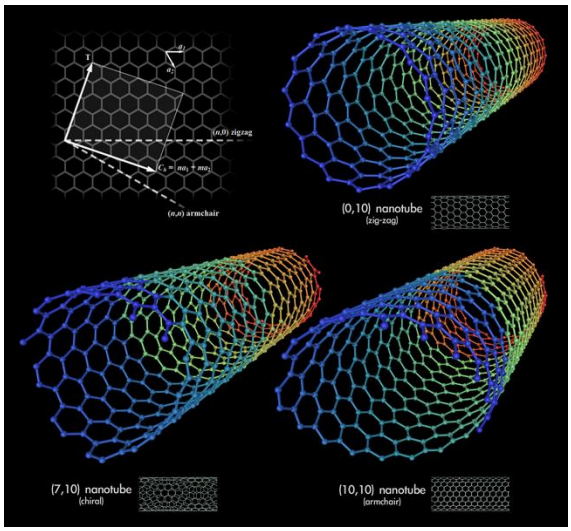
the year of 1960 which differ from chemical sensors in two different aspect (a) the sensing element consist of biological materials such as proteins, enzymes, (example; blood smaple, cell receptors, antibodies, poly-nucleotides, micro-organisms, or whole biological tissues). Currently much attention has been intended to focus on the developing nanomaterial, they are usually take advantage of lager surface area for bio molecules to be immobilized. That generally increases the binding sites available for detection of specific chemical analyte. Electro-chemical biosensors are most popular biosensors. The various nanomaterial are used in electro chemical sensors. CNTs (carbon nanotubes) are mostly used nanomaterial due their fascinating properties, such as unique chemical, electronic, mechanical. The CNTs have large length-to-diameter ratio provides for high surface-to volume ratios.



(a) This image gives the information about the structure of CNTs..

CNTs possessed SP^2 carbon units with several nanometers in diameter and many microns in length. Depending on the graphene sheets rolling there are different structures of CNTs. In a graphene the points O&A are crystallographically same this points can be connected through a vector called chiral vector (OA) based on this vectors value and by its angle the carbon nanotubes are differentiated into chiral, zigzag, armchair. There are two types of CNTs Multi-walled carbon nanotubes (MCNTs), Single-walled carbon nanotubes (SWCNTs). The carbon nanotubes can be synthesized by electrical arc discharge, laser vaporization, chemical-vapor deposition methods, CNTs behave as metals or semiconductors based on diameter and degree of helicity. More over CNTs outstanding ability to mediate fast electron transfer kinetics for a wide range of electro active species like hydrogen peroxide and also CNTs chemical functionalization can be used to attach almost any desired chemical to it.

The review focus on the use of CNTs as electrochemical sensors and biosensors. Their are thousands of papers published on this topics during the last decade and more research is

going on. This article is organized as follows, first an overview on the process how the different types of CNTs are prepared, and how a biosensor can be functioned, then the next section describes about the properties of CNTs and their functions as biosensors. The complications due to the use of CNTs based biosensors in day-to-day life. Then finally future use and development of CNTs, and conclusion.

SYNSTHISIS OF CNTs BY DIFFERENT METHODS:

The CNTs can synthesize by use different methods like 1) Arc discharge method, 2) Laser Ablation method, 3) Chemical vapor deposition method (CVD).

Arc Discharge Method: The nanotubes were observed in 1991 in the carbon soot of graphite electrodes during an arc discharge, by using a current of 100 amps that was intended to produce fullerenes.

The yield of this method is up to 30% by weight and it produces both single and multi-walled nanotubes with lengths of up to 50 micrometers with few structural defects. Arc-discharge technique uses higher temperature above 1,700 degree centigrade for CNTs synthesis which typically causes the expansion of CNTs with fewer structural defects in comparison with other methods.

Laser ablation: In laser ablation a pulsed laser vaporizes graphite target in a high temperature reactor while an inert gas is bled into the chamber. Nanotubes develop on a cooler surfaces of the reactor as the vaporized carbon condenses. A water cooled surface may be included in system to collect nanotubes.

The laser ablation method yields around 70% and produces primarily SWCNTs with the controllable diameter determined by reaction temperature. But it was more expensive than either arc discharge or chemical vapor deposition.

Chemical Vapor Deposition: The chemical vapor deposition is the most popular method of producing the CNTs. Thermal decomposition of hydrocarbon vapor is produced in presence of metal catalyst by this process. Therefore it is also known as thermal CVD or catalyst CVD.

When compared to the above two methods this, method is simple & economic for synthesize of CNTs at low temperatures, & ambient pressure. In crystallinity of CVD grown CNTs is less accurate then both methods but SWCNTs are some close to the other methods. The purity & yield CVD is higher compered to arc and laser

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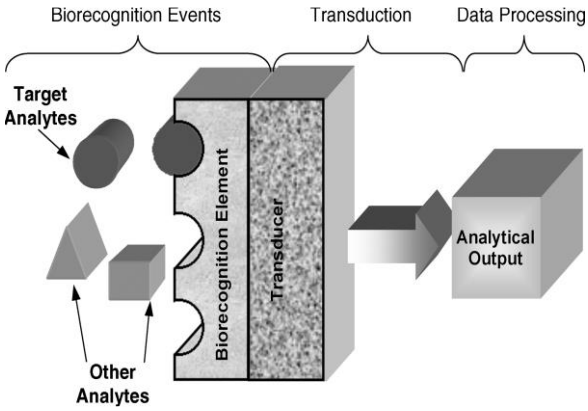
methods. Structure and architecture CVD is only way for the growth of CNTs. CNTs grown in CVD method have many advantages that they can have variety of forms powder, thin or thick films, aligned or entangled, straight or coiled nanotubes, or desired structure of preferred sites of a patterned substrate.

Electro-Chemical Biosensors Based on CNTs: The electrochemical nano biosensors are having extremely lower limits of detection, they are some of frequently used biosensors. The electrochemical biosensors are inexpensive they can easily make on smaller scale, essential and also they requires simple electronics for accepting certain circumstances by making them most suitable for point of care applications. An electro-chemical-biosensor is analytical tool for sensitive & selective detection of bio-molecules. CNTs are extremely attractive for fabricating electro-chemical biosensors due their specific properties like conductive, adsorptive & biocompatibility. Vertically aligned CNTs can be coupled with enzyme to provide a favorable surface orientation and act as an electrical connector between their redox center and the electrode surface. Electrochemical transducer is based on the movement of electrons in the redox reactions detected when a potential is applied between the electrodes. The electrochemical sensors can be based on potentiometry, amperometry (detection of ions based on change in electric current), voltammetry(in this the information of analyte is obtained by measuring current as a change in potential), coulometry, AC conductivity or capacitance measurements. Most of the CNT based electrochemical biosensors perform the detection of bio-molecules amperometrically.



This image give us an idea about the biosensor working.

There are mostly two cases like enzymatic biosensors, & enzyme-free electrochemical biosensor. There are number of aspects which we need to consider when analyzing a various biosensors. First of all we have to know the range of sensor that in which range it is sensitive. Next the sensor stability

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which plays key role in detection of bio-molecules.

Biosensors based on CNTs: This type of sensors are most frequently used from 2000. There are in different biosensors like oxygen biosensor, glucose biosensor ,lactate, cholesterol . Mostly the glucose biosensors have gathered a significant place in the sensing field as the glucose biosensor is used to sense glucose (sugar level) in the blood and body fluids of the diabetic patient as the diabetes is mostly occurred diseases in the world. The oxygen biosensor is used to measure the level of oxygen in the blood and body. As the oxygen sensing devise have a high interest in medical, environmental, & food processing industries. The enzymatic biosensors used to catalyze oxygen reduction to water. The MWCNTs are having high interest due to the electro-active surface area because of nano-structuring of electrodes. All this leads to thin layering which in turn leads to layer formation. Due this layer when any redox reaction occurs at the carbon nano-tubes surface leads to increase to obtain the currents which h obtained due to oxidation or reduction of chemical substances. Due this type of feature the enhancement two main abilities of electrochemical bio-sensor likely sensitivity and reliability.

Future perspectives: Beyond the applications mentioned above in the field of CNT based biosensors is currently experiencing a more developments in the future.

One of the developments of CNTs is integration of biological cell membranes and CNT transistors which give the way for the obtaining information about the distribution charges within the membrane. The most recent advances like implantation of CNT biosensors into living biological tissues, & development of novel fluorescence based CNT sensors, and another most important issue related to the integration of CNTs into cells & tissues to study the cytotoxicity towards biological species. Therefore many and many more experiments are going on process to find out the toxicity of CNTs when in contact with cells & tissues.where as MWCTs have been found to cause irritation in human keratinocytes and SWCNTs reported as toxic to mammalian cells beyond $10\mu mol/L$. where as in some of the studies the chemically modified CNTs can reduce their cytotoxicity to some extent. Moreover the studies based on the effects of CNTs on human cells and tissues as well as information related to safety issues are still lacking, and future work must concentrate on addressing these aspects.

Conclusion: Due to their small size and excellent electrochemical properties, CNTs continues to attract enormous interest as components in biosensors. The CNTs modified

electrodes allows the direct transfer of electrons with enzymes.where as the chemical modification of CNTs has proven to be an effective way to impart selectivity to resulting biosensor. In the developmental of CNTs we need to prevent the nonspecific adsorption of biomolecules onto the tube wall. The CNTs exhibit excellent electro-catalytic activity in redox behavior of different compounds.

However there are number of challenges for CNTs to become a part of in the application of a biosensor. The production of CNTs with defect free and to produce pure one's is difficult and costly. Where as processing of CNTs is not fully controlled and the lengths and diameter of the nanotubes are uncontrolled. The CNTs causes much toxicity for biological organisms. They are mostly insoluble in most solvents. The CNTs can be dispersed in Nafion, Teflon, CS, mineral oil, sol-gel, silica, & in some polymers but the chemical nature and conductivity is impaired or decrease. While there have some disadvantages of CNT-modified electrode for sensing application the continuous growing research interest in the field is contributing to overcome them. The aforementioned outstanding properties of CNTs make them an exciting alternative for the development of novel electrochemical sensors and biosensor. It is believed that the merits of CNT-based sensors will bring dramatic changes to future sensor industry.

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TITLE

Identification and classification of Brain Tumor using Image Fusion and Neural network

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ABSTRACT:
PET(Positron Emission Tomography) and MRI(Magnetic Resonance Imagining) images of brain are fused with the help of Stationary Wavelet Transform. After the decomposition of wavelet, fusion of gray matter (GM) and with the application of our method, a good and clear fused result can be got, with the adjustment in structural data of gray matter(GM) and addition of spectral information in WM(white Matter) area. There are three datasets used for the comparison and testing i.e.: normal coronal, normal axial, Alzheimer's disease images of brain. In the term of average gradient and spectral discrepancy our fused method is performed better quantitative and visually both quantitatively.

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ABSTRACT

PET(Positron Emission Tomography) and MRI(Magnetic Resonance Imagining) images of brain are fused with the help of Stationary Wavelet Transform. After the decomposition of wavelet, fusion of gray matter (GM) and with the application of our method, a good and clear fused result can be got, with the adjustment in structural data of gray matter(GM) and addition of spectral information in WM(white Matter) area. There are three datasets used for the comparison and testing i.e.: normal coronal, normal axial, Alzheimer's disease images of brain. In the term of average gradient and spectral discrepancy our fused method is performed better quantitative and visually both quantitatively.

KEYWORDS

Feed Forward Neural Network (FFNN), Positron Emission Tomography (PET), Magnetic Resonance Imagining (MRI), Skull Stripping, Segmentation, Stationary Wavelet Transform(SWT), Thresholding.

INTRODUCTION

In human body all the mental and physical activities are most probably controlled by the Human Brain. It is the most knotty organ of the human body. Any irregular or abnormal growth of tissues around or in the brain is commonly indicating the sign of Brain Tumor. Diagnosis of tumor in brain is the main challenge. To identify tumor, Doctor's analyzes different types' images like PET, MRI etc. Mainly it is of two types- malignant or cancerous and benign or non-cancerous. Among these two Malignant tumor is the most lethal or dangerous diseases. Brain tumor increases pressure in human brain also can damage other CNS (Central Nervous System). Blurred vision, dizziness,

headache, nausea, full or partial amnesia etc are the most common and few major symptoms of brain tumor. Radiation, Chemotherapy and Surgery are the possible ways that included in treatment of this disease. This disease has been graded from grade I to grade IV i.e. less aggressive to more aggressive range. Primary stage of brain tumor is originated in human brain and after knowing the types of cell from where it is originated decide name of this stage. Secondary stage of brain tumor is spread anywhere else in body parts of human that spread to the human brain. Seeing the cell type and location, Brain tumor is classified in 120 types by the WHO (World Health Organization). Meningiomas, Gliomas, CNS Lymphoma, Schwannomas and Pitutary are the most common tumors that found in adults.

For the treatment of Malignant tumor it is very important to identify the tumor on its primary stage and also detect the exact size and location of the tumor. Biopsy is the most accurate method to detect the tumor, in this method patient need to undergo for a surgery. But without any surgery, the medical imagining techniques play a vital role to detect such type of tumor and with the help of this image Radiologists easily find out all the detail of tumor. It also helps them to plan treatment. These imagining technique include PET (Positron Emission Tomography), MRI(Magnetic Resonance Imagining)etc.

MRI uses the magnetic field's strength so that atom of human body can easily respond and scanner can detect the emissions, that is analyzed and an image is produced. In this imagining process greater contrast are found between unusual soft tissues of human body parts.

In the human body to identify the difference between chemical and metabolic activity, radioactive positron are used by the PET scan. Increased activity area will be a colored image. MRI scan focus at structure in human body and PET scan focus on function. Since there is very rapid division of cancer cell which generally indicates more metabolic activities. Very small region of activity can be picked up by PETS. As a- it can detect much smaller activity than CT or MRI. In modern times most of the research works considered MRI as the imaging data for the source. But when the size of tumor is very small then PET is used over MRI. PET is used if tumor recurs or in the tumor after the treatment of tumor. If there is any leakage in the region of boundary of tumor, then MRI creates problem. In this situation as an alternative PET is used to detect brain tumor at early stage.

Image data is the first thing that is acquired from a database of standard medical imaging. For the input scanned image is accepted with normal size. The grayscale images are obtained by conversion of the colored ones and it is defined by the use of large 2-D matrix with numerical entry values (0-255).

There are two phases comprised in pre-processing: image registration and image smoothening. For the noise removal, image sharpening and removal of text all these are done by image smoothening. It is trailed by enhancement phase of image. an accurate standard image is obtained at this stage by applying different image processing filters on the input image.

For the partition of a digital image into the no. of sets of pixels that are known as super pixel is the process of image segmentation. The purpose of the segmentation is to detect the ROI (Region of Interest)

Literature Review:

Thermal and visible image fusion using brain storm optimization and curvelet transform IEEE2018.

An image fusion framework optimized by brain storming in Curvelet transform domain combining visual and thermal images is used to get one fus image giving required information. Here curvelet transform decomposes source images and maximum selection rule is used to fuse sub-band coefficient of high frequency, whereas those of low frequency are fused using the rule of Weighted Linear Combination. BSO(Brain Storm Optimization) algorithm based on human intelligence lets us find the optimal weights in the fusion of sub band coefficient of low frequency. There have been made different simulations to compare our results and other multi resolution fusion method for example the gradient pyramid (GRAD), NCST (Non Sub-sampled Contourlet transform) and SIDWT (Shift Invariant Discrete Wavelet Transform). The assessment of fused image quality is done by five quality matrices and it is found that this method is better than methods containing multi resolution fusion in term of quality metrics both subjectively and objectively.

Multimodal fusion of brain functional and structural imaging with a Deep Neural Machine Translation Approach IEEE 2018

Multimodal brain imagining data e.g. fMRI (Functional MRI) and sMRI (Structural MRI) linkage are found by a unique approach of Deep Neural Machine transform translation in this work. Here we want to consider two diverse imaging views of one brain like two different language giving same concept and effects. An attention network module if translation model is an important aspect that tells alignment between feature from sMRI and fMRI. For this translation model feature of ICA(independent component analysis) base is used by us.

Large scale fusion of brain imagining modalities and features using Markov-style dynamics in a feature meta-space IEEE 2018

Though incompletely in the brain imaging technology leads to sample different aspect of brain and yielding various features crossing rest and task condition as well as increasing number of imaging modalities. Brain imaging data usually helps study extremely complex conditions and researchers are more commonly using this for two or more biological or data modalities in their studies. Though this area has got advanced approach to multimodal data, still many studies ignore combined information among more than one task, features or modalities.

PROPOSED SYSTEM

Here the 1st stage is Image Acquisition that is the process of capturing original images and storing them in a digital form. Many types of imaging system like PET and MRI are available for brain analysis. Both of PET and MRI have unique role in medical image processing PET images give tissue density according to there capacity to filter x-rays while MRI gives more contrast between soft tissues so helps detecting brain cancers and tissues.

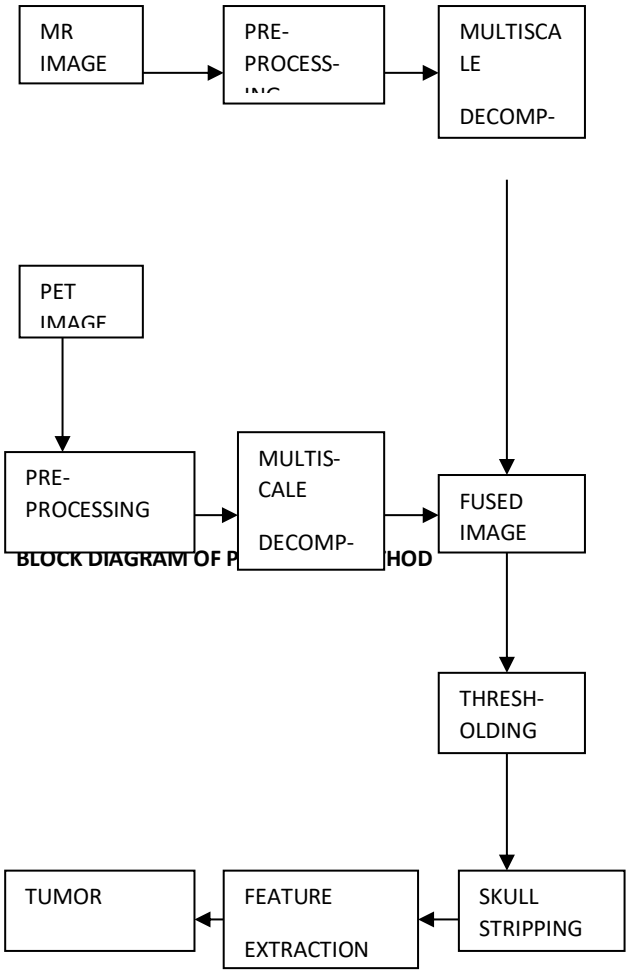
Image resampling and enhancement is preprocessing stage. Resampling changes no. of image pixels and so different width and height of original image give a new version. Upsampling is increase in image size and reverse is downsampling.

Next is making image brighter, more detailed and visuals is called contrast enhancement. Histogram equalization is a common technique for this globally. This allows improvement in image

contrast with narrow histogram. This technique keeps values in matrices unchanged instead it modifies matrix value related color value so give full dynamics range to every color evenly.

Next is the image decomposition using SWT processed images are passed through respective wavelet filter? To get result the source image having various wavelets undergoes wavelet transform and many other decomposition levels.

The decomposed images are fed to next stage. The coefficient of these decomposing images is used to fuse two images. Method of different fusion coefficient yields different type of performances.



BLOCK DIAGRAM OF P HOD

FIG.1

Result and discussion:

In the proposed method two images are used as an input image, one is MR image and the other one is PET image for this method we are using registered images only. These two images are provided by the pre-processing image and after that decomposition image. Thus resultant image that we obtain is fused image. Algorithm of fusion is repeated for different decomposition levels and different wavelets after getting the resultant image the effect of image was done through mean square error and peak signal to noise ratio. By using Artificial Neural Network the resultant image used as extraction of tumor area after segmentation. The segmented images are performed by the skull stripping.

COMPARISION BETWEEN EXISTING AND PROPOSED SYSTEMS

Problem	Existing systems	Proposed system
Noise	Noise will be high.	Only 2% noise
Redundancy	Over lapping is high	No overlapping
Accuracy	Less accuracy	97% accurate
Transformation	DWT	SWT
Images	CT and MR images	PET and MR image

Conclusion

MR and PET images are used to detect brain tumor on human body with the use of redundant and comple-mentary information. Image fusion based on wavelet used to create good fuse images with spectral and spatial information in the proposed method. This method can be used to automatically spot brain tumor by use of ANN as well as confirm the location of tumor and it's region. Image fusion results using different wavelets are put to comparison for PSNR and MSE during recognizing tumor to the PET and MR images.

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TITLE

Implementation of Li-Fi Technology for optical data transfer in Underwater system.

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ABSTRACT:

In recent times the underwater acoustic communication plays a vital role in the field of wireless communication. Underwater acoustic communication is used for the monitoring of obstacles and to protect the endangered species. In the earlier systems, electromagnetic waves were used, which was found to be with less efficiency. The proposed system is devoid of all such deformities and has better efficiency. This system presents the design and implementation of underwater communication through Li-Fi. The data or information is sent from the transmitter submarine to the receiver submarine. The system developed provides secure communication between submarines. The voice signal, which is transmitted using light waves of low noise. Initially, the voice signal is converted into digital values and these digital data values are converted to RGB values. RGB values obtained are transmitted as light waves of receiver submarines.

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Abstract— **In recent times the underwater acoustic communication plays a vital role in the field of wireless communication. Underwater acoustic communication is used for the monitoring of obstacles and to protect the endangered species. In the earlier systems, electromagnetic waves were used, which was found to be with less efficiency. The proposed system is devoid of all such deformities and has better efficiency. This system presents the design and implementation of underwater communication through Li-Fi. The data or information is sent from the transmitter submarine to the receiver submarine. The system developed provides secure communication between submarines. The voice signal, which is transmitted using light waves of low noise. Initially, the voice signal is converted into digital values and these digital data values are converted to RGB values. RGB values obtained are transmitted as light waves of receiver submarines**.

Keywords—Li-fi, underwater communication,Acoustic

I. Introduction

What is LI-FI?

Light Fidelity is a wireless communication technology that enables transmission of data through light. LEDs are used as transmitters and photo detectors are used as receivers. Data transmission is achieved through flickering of LEDs. When LED is off "0" is transmitted and when LEDs are on "1" is transmitted [1].
The design challenges in Light Fidelity for indoor communication environment are ambient light noise, free space loss and inter-symbol interference (ISI) caused by multipath dispersion.

Why LI-FI?

The idiosyncratic proclivity of Light Fidelitypresents various advantages over radio frequency communication.

Reduced intricacy and cost:

The LI-FI receiver is little complicated in design than an RF receiver. The combination of easy modulation methods and the truth that the important transmission component, LEDs previously present in automobiles, this reduces the added expense to actualize automotive lighting and indoor communication.

Scalability:

RF habitually experiences the greater slow response and fewer data reception rate because of greater node count that takes part in channel contention Light Fidielityfiltering methodology relies on the characteristics of optical propagation. Overhead is not necessary because it is largely scalable.

Positioning potential:

Traditional positioning system such as Global Positioning System (GPS) only provides an accuracy of ten meters whereas Light fidelity Positioning (VLP) has a positioning capacity of tens centimeters. This makes VLP suitable for automotive safety and indoor positioning applications.

Security:

The Line Of Sight (LOS) operation makes it more secure from attackers than traditional RF communication. A malevolent attacker to pass on fake data or jam a LI-FI must be in close operation range due to LOS property of LI-FI. As an added advantage the positioning capability can provide added layer of defense by substantiating whether the message acquired is sent from an appropriate position.

literature review

Acoustic communication provides a variety of application for command and control links, The data rate is limited. The methodology was to examine a field ready UWOC system in a challenging environment of operational relevance. To enhance robustness a 2x2 MIMO approach with two orthogonal linear polarized laser beams at 520 nm wavelength and two receiving optics was deployed. We depicted the feasibility to reduce transmission errors or improve range at constant packet loss with two channel operation.(1)

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The structured obstacles and closure or semi-closure barriers pose demanding challenges to communication link because of acoustic sheltering and remarkable reverberation in acoustic underwater vehicle. Majority of the current underwater acoustic networks are calibrated in terms of the communication and network performance cross-media link supporting of small AUV in confined space (2).

The chaotic modulation communication is better, when compared to traditional pulse-position modulation (PPM) and pulse-width modulation(PWM), but the rate of data transfer is still not increased.

whether it was CPPM technology or CPWM technology only carried one bit of information in every complete chaotic pulse. a new communication methodology for the underwater acoustic communication is put forward depending on the CPWM technology, which fused the chaotic pulse position characteristic and the chaotic pulse width characteristic called chaotic pulse-position and pulse-width combined modulation communication system. The CPWCM communication system has twice the concealment, compared with CPPM and CPWM communication system, the fused modulation has greater concealment, higher communication rate and greater effective bandwidth. The work analyzes the error rate performance of CPWPM system via simulation experiment, and analyzes the effectiveness of CPWPM system. The performance of CPWCM system is verified under the Tent map, and the error rate of the system is checked. The CPWCM modulation can carry 2 bits of information per pulse, so the communication rate is twice times higher than the existing PPM, PWM and CPPM modulation modes (3).

The work is dedicated to the problem of accuracy of distance measurements and reliability of data transmission between underwater acoustic modems in cases when transmitting and receiving devices are moving relative to each other. The algorithms of signal processing with short pseudorandom sequences utilized in the experiments allow effective work both under strong multipath propagation and instable behavior of the communication channel, and ensure the BER level less than 5%.(4) two pairs of 100Mbps transmitters and receivers based on low-cost TO56 packaging 520nm laser diodes (LDs) and PD modules are developed, and an 100Mbps full-duplex underwater wireless optical communication system (UWOCS) is experimentally demonstrated. The feasibility of system is demonstrated and verified experimentally. Moreover, the impact of different types of seawater on the performance of wireless optical channel is experimentally investigated (5). In absence of satellite positioning, Navigation and Communication on land would be very tough and today we cannot imagine without satellite communication networks. The scenario underwater is much very complex because of high attenuation of radio waves. However, due to the various nature of communication above and underwater, facilitation of relevant data flow between these environments need presence of some kind of communication hub. Idea of replicating concept of positioning/communication satellites able to play both roles simultaneously to set up Internet of Underwater Things (IoUT), hence, worth considering. In light of this idea, the University of Zagreb developed a one man portable autonomous surface vehicle (ASV) with suitable lightweight localization and communication payload. This paper describes an ASV and its role as a satellite for the underwater environment and implementation of IoUT. The paper elaborates three real applications: support to diving operations where a diver tracking and communication link to diving tablet ensures multifunctional support to the diver, i.e. diver following,

monitoring, assistance, and improved safety of the diver; support to Autonomous Underwater Vehicle (AUV) operations by allowing real-time remote access to underwater measurements and vehicle status and by extending AUV subsea deployment substantially by correcting the dead reckoning navigation error; underwater wireless sensor networks aided by swarm of ASVs for data forwarding, localisation, recharging and deployment under different environmental conditions.(6).

In Japan Agency for Marine-Earth Science and Technology (JAMSTEC), several autonomous underwater vehicles (AUVs) and a manned submersible SHINKA6500, which has a capability to dive up to the depth of 6,500 m, have been operated and contributed various scientific researches in deep water. These vehicles are equipped with vertical acoustic communication systems with the mothership. However, these systems have not been updated since they were built originally. Therefore, last year, a prototype of very high-rate communication system was developed, and its performance was verified in an at-sea experiment, with installed in SHINKAI6500. As results, the effective data rate of 69.24 kbps at highest was achieved from the depth of 3,600 m with no error using the frequency band of 10 kHz, that is, its spectral efficiency was 6.924 bps/Hz. The performance was very stable even under the effects of the fluctuation of the mothership and ascending/descending movement of the submersible, whose velocity was up to 2 knots approximately. Thus, it was demonstrated that the new developed communication system is very effective for vertical communication between an underwater vehicle and a mothership (8)

With the development of underwater acoustic communications (UWAC), jamming methods for UWAC becomes much more attentive in communication countermeasure system. Direct sequence spread spectrum (DSSS) signal as a way of reliable covert communications is widely used for UWA channels. In this paper, single-tone jamming, narrowband jamming and correlated jamming based on PN code PSK modulation for UWA DSSS communication system are compared under different signal-to-noise ratio first, which assumes that the jammer knows perfect parameters in DSSS signal. Besides, performance of the above three jamming methods are compared by simulations under the blind estimates of carrier frequency, chip length, period of PN code and PN code itself, which demonstrates the influence of the estimation error on these jamming methods.(9).

In recent years, with the exploitation of marine resources and the rapid development of marine environmental research, underwater acoustic communication technology has been a hot topic in the communication field. Underwater acoustic signal recognition and parameter estimation therefore have become increasingly attractive. Direct spread spectrum sequence signal(DSSS) is also widely used in the field of underwater acoustic communication. However, the complexity of the seawater environment is

the reason for the multipath interference and low signal-to-noise ratio(SNR), which lead to great challenges and difficulties to the research of the underwater acoustic signal recognition and parameter estimation. This paper presents two efficient algorithms for estimating the parameters of the underwater acoustic DSSS signals. An approach of Triple Correlation Function(TCF) of the underwater acoustic DSSS signals is proposed, which can estimate the Pseudo Noise(PN) code sequence blindly. The period of PN code sequence is estimated by the reprocessed power spectrum method. Theoretic analysis and experimental results show that the two approaches are very robust, working well in the underwater acoustic environment with multipath interference and low SNR(10)

PROPOSED SYSTEM

The computer sends data to the transmitter which transforms electrical signal into optical signal. The data mod- ulates on the optical signal and passes through the underwater channel and is detected by the receiver. The receiver converts the detected optical signal into a electrical signal; which is then received by the receiving computer. In the following sections, we provide details of the optical transmitter and receiver.

A. *Optical Transmitter*

While designing an optical communication system, the main part is to select the type of photon source, since the rest of the circuit components will condition the photon source. So as to select the most appropriate photon source, it is necessary to compare the available sources which are LEDs and laser diodes, in terms of cost, simplicity, efficiency and restraints on the system as well as the use of the system in both free space and underwater. Both LEDs and laser diodes have merits and demerits, although laser diodes have higher optical output, minimal divergence and coherent light, they are not optimal for underwater communication. Since the system has to be deployed in a confined space and limited power AUV, the system needs to be compact and power efficient. Consequently, it has to work underwater without exact alignment of the transceivers due to floating AUV. The system has to be power efficient, small sized, less complex which can transmit at longer distances that's why LEDs are a viable choice due to their less cost, size, power and longer lifetime. To construct an optical link it is important to understand the loss of optical energy. Absorption and scattering effects the light propagation in water. Both of these factors are wavelength dependent and results from attenuation and broadening of light by water molecules and marine hydrosols (mineral and organic matter).

B. *Optical Receiver*

The optical receiver comprises of photon detector, which transform optical energy into the electrical current. Photo diodes were used as the photon detector because of their faster speed, small size and excellent ambient noise performance. As photo-diodes are current controlled devices, the current needs to be changed into voltage, which is then buffered and squared by comparator and finally made compatible with RS232 voltage levels (see Figure 4). As discussed earlier, photo-diode is a device that operates in reverse bias, and the reverse current increases with the increasing light intensity. Most electrical devices work based on changes in voltage levels as opposed to changes in current levels. Therefore, the current signal coming from the photo-diode must be first transformed into a certain voltage level. One of the basic ways of achieving this is Ohm's law. The device is used as variable voltage regulator in the circuit to provide 3.7V for laser source. This part of the circuit serves as a redundant power source for the rest of the circuit which requires less than 5V. The output of the device can be fed to the laser source in case the other LED source does not work. In this way, the circuit can be used for both LED and laser sources and consequently the system can operate both underwater and in free space.

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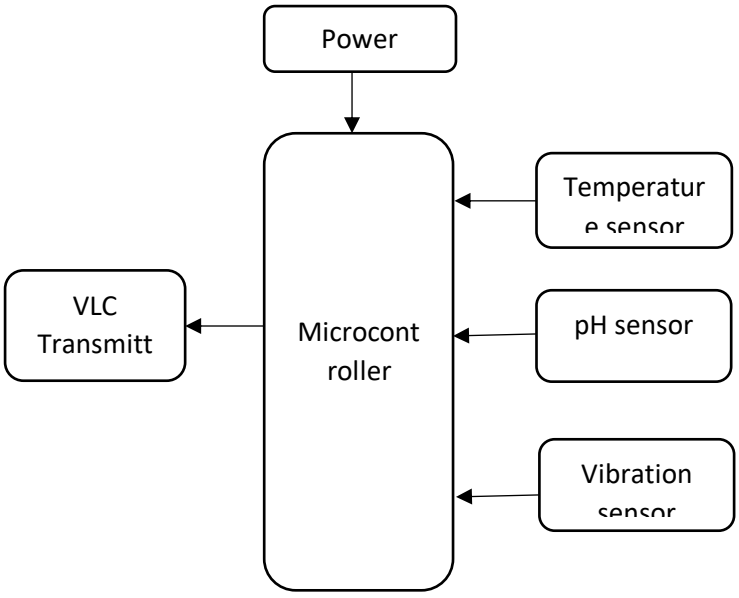
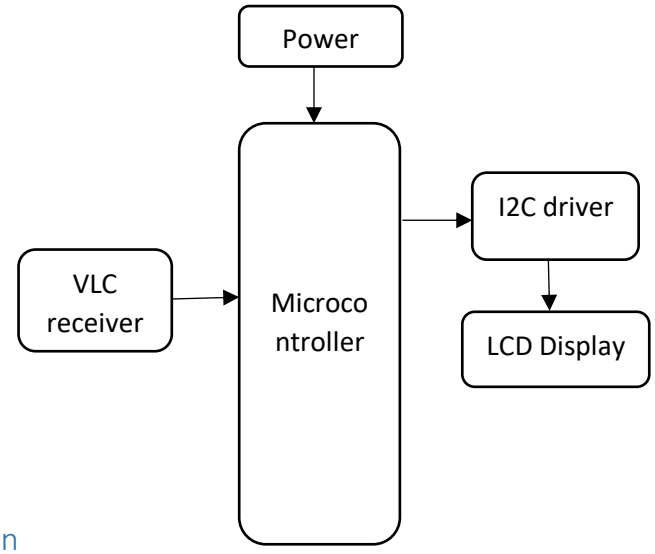
Block diagram

Transmitter section





Receiving section

results and discussion

Comparison of various communication technologies Light fidelity communication is compared with different communication technologies on the basis of various parameters such as data rate, security, cost and summarized in table 1.

Table.1: Comparison of various communication technologies

Technology	Data rate	Cost	Security	Range
Infra-red	16 Mb/s	Low	High	1 m
NFC	424 Kb/s	Low	High	10cms
Bluetooth	3 Mb/s	Low	Moderate	100 m
Zigbee	250 Kb/s	Low	Less	100 m
Wi-Fi	600 Mb/s	High	Moderate	4 km
LI-FI	500 Mb/s	High	High	2 km

V CONCLUSION

This proposed system is useful for the underwater communication at faster speed in Gbps. It can overcome the problem occurring in the communication. it provides the secure communication so possibilities of hacking the system is less The system can be implemented in Indian navy which eliminates problems in the communication between the ships. This system is very cost effective it is effective than the other systems like the Acoustic wave communication and Ultrasonic wave communication. So, this system may be replaced by existing underwater communication techniques and it is better than the existing systems

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TITLE

PUBLIC WATER SUPPLY GRID MONITORING TO AVOID TAMPERING & WATER MAN FRAUD USING IOT

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ABSTRACT:

This research paper describes now days in urban areas the water supply to residence and commercial establishments are provided at a fixed flow rate. There are certain incidents that excess water is drawn by the customer or other users unofficially then it is considered as water theft. So in this project we propose a method for developing an embedded based remote water monitoring and theft detection and prevention system by taking the data base of water supply at the consumer end. The overall objective of a distribution system is to deliver wholesome water to the consumer at particular area and in sufficient quantity and achieve continuity and maximum coverage at affordable cost.

To attain this objective the organization has to evolve operating procedures to ensure that the system can be operated satisfactorily, function efficiently and continuously as far as possible at lowest cost. All the details will be shown in the web server using IOT module connected to the controller. So that the authorities can take necessary action in case of misuse. This is an advanced, trouble-free, and fit and forgets system for water board. By using all these malfunctioning can be avoid

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ABSTRACT

This research paper describes now days in urban areas the water supply to residence and commercial establishments are provided at a fixed flow rate. There are certain incidents that excess water is drawn by the customer or other users unofficially then it is considered as water theft. So in this project we propose a method for developing an embedded based remote water monitoring and theft detection and prevention system by taking the data base of water supply at the consumer end. The overall objective of a distribution system is to deliver wholesome water to the consumer at particular area and in sufficient quantity and achieve continuity and maximum coverage at affordable cost.

To attain this objective the organization has to evolve operating procedures to ensure that the system can be operated satisfactorily, function efficiently and continuously as far as possible at lowest cost. All the details will be shown in the web server using IOT module connected to the controller. So that the authorities can take necessary action in case of misuse. This is an advanced, trouble-free, and fit and forgets system for water board. By using all these malfunctioning can be avoided.

Keywords:

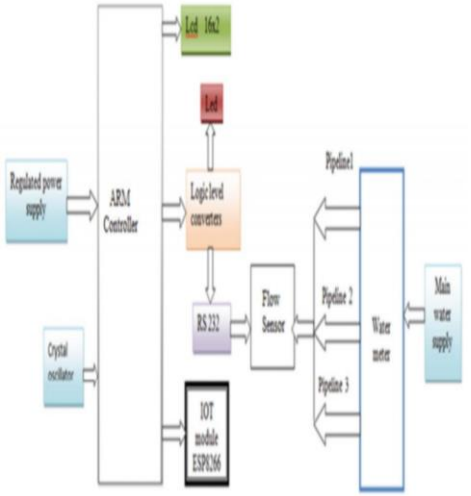
IOT,LCD,MICROCONTROLLER, LOGIC GATES.

INTRODUCTION

As the population and economic growth increases the demand for water supply also increasing day to day life. It is very difficult for the enterprises to continuous monitor and manages the water of leakage and stealing of water by the consumers. So in order to overcome this problem the urban water supply networks form the link between drinking water supply and drinking water consumers. Hospitals and factories need continuous supply of water in large scale, so urban water supply systems are public enterprises are usually a part of local government, look after the continuous monitoring and maintaining of the water supply. In this research work it is proposed to develop an embedded based remote water monitoring and theft prevention system by recording the flow rates at the consumer/user end. In order to implement the proposed water supply system, all the consumers are provided with an embedded based water flow monitoring system consisting of micro controller to record the water flow rate using flow sensor and transmit the information to remote monitoring station using wireless transmitter.

With the rapid development of global system mobile infrastructure and information communication technology in the past few decades has made the communication is reliable for transmitting and receiving information efficiently.So here we used GSM modem for efficient communication purpose. A design is based on RF and Zig bee which has some shortcomings, such as high power consumption, near distance and network's size is small. So, GSM is chosen in this project. In the high-end applications of embedded system, ARM Company has introduced a 32-bit ARM family which includes ARM7, ARM9, ARM9E,

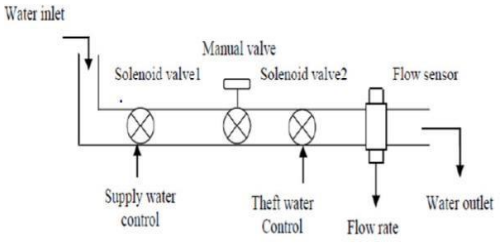
ARM10E, and ARM11 and so on. Where, the ARM7 has some advantages, such as running the μC/OS-II embedded operating and low cost and so on. So it can meet the design's requirements of this system fully. Therefore, in hardware design this system uses ARM7



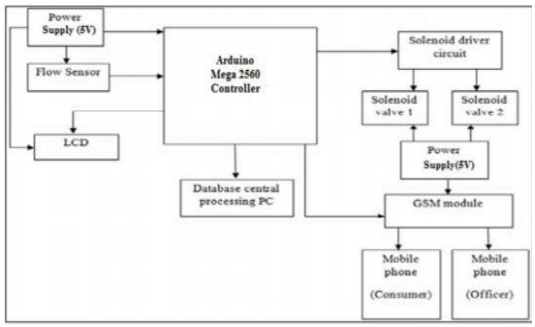
EXISTING SYSTEM:

The existing method provides electrically operated solenoid value for water supplying to the consumers. The valve turns on and off automatically by central processing station PC to supply water for a particular period of time.

The system is an electrically operated solenoid valve to supply water the valve turns on and off automatically by the PC to supply the water for a particular time period. The device will switch on and off the solenoid valve using a transistor as a switch. It is proposed to process a GSM module for wireless communication then by using this we can pass this information to mobile phones for immediate action as well as sent to the central processing data base.



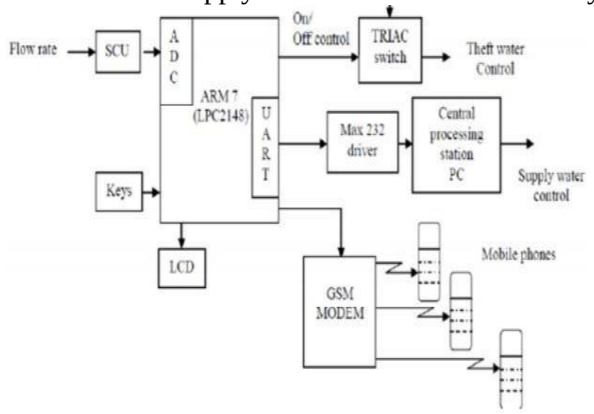
Existing System Model



System Description

PROPOSED SYSTEM:

In this system, micro controller and LCD are arranged to display the quantity of water present in pipelines. As logic level converters and water pipelines are connected by RS 232 serial communication to detect the presence of water flow in one or more pipelines by using leds. Water should be released as per the instructions by officials' i.e. for example alternate days of supply are provided and only during specific period of time but not daily. All the details will be shown in the web server using IOT module connected to controller. So that authorities can take necessary action in case of misuse. This is an advanced, trouble-free, and fit and forgets system for water board. By using all these malfunctioning can be avoided. The flow rate is sensed by the signal conditioning unit when the water is passed through the pipeline. The sensor operates under certain predefined value. When there is a variation in the water flow due to any pumping of water through motor, it will be detected by the water flow sensor. The signal conditioning unit is used to give the desired input signal of the ADC. The analog signals generated due to variation in the flow of water sensed by the water flow sensor are converted into digital signals using Analog to Digital Convertor (ADC) and this digital signal is given to Microcontroller. This microcontroller enables the transmitter signal for intimate to water supply board. At the same time they enable the driver unit to closes the solenoid valve.

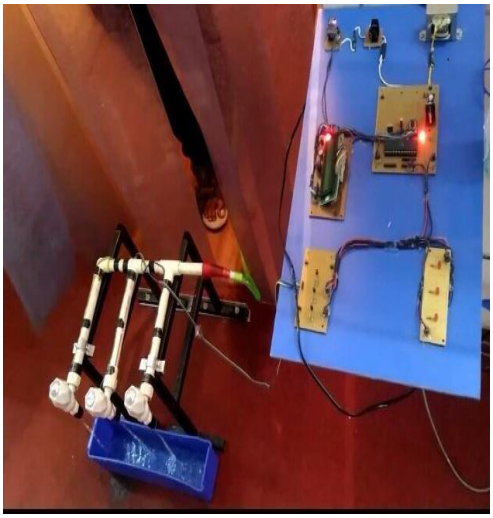


Proposed system

The microcontroller is doing have the capability for driving the solenoid valve. The flow rate conditions are displayed by the PC. Then here we proposed GSM Modem for wireless communication so that the information can be passed to many responsible officers cell phone for immediate action. The communication is done with help of MAX232 IC between the microcontroller and PC. To communicate over UART or USART.

RESULT:

System will automatically turn on/off the solenoid valve of supply water control so that for a certain amount of time consumer can use the water. For given time, if any consumer uses motor pump to draw excess amount of water then system will automatically identify theft. If theft has been identified, system will take appropriate action such as turning off the solenoid valve of theft. . Also when theft is identified the alarm will start ringing. The real time pipeline arrangement, it has two solenoid valve (one input side and another near output side) It has been implemented with one node.



Circuit Assembly

CONCLUSION

Extensive growth of population development and technology has leads to the need of proper utilization of the natural resources especially water. Thus our proposed system and the review of all the possible implementation of technology is the first step toward prevention and proper utilization of water.*To overcome the problem of the water theft vandalism and mainly the automation in water distribution system is successfully implemented. The review of automated water distribution system with the various controllers and parameters focuses on the entities such as proper supply, red alarm pop-ups, filtration, flow control, supervision using various protocols is concluded with the future aspects of real time implementation in the municipal corporations where scarcity of water is the huge issue.

SCOPE OF FUTURE WORK:

- It can be used to detect water usage of each house. Also can create an separate app (thing speak) to view the information regarding water usage.
- It can be developed as if the water overflows then it should automatically turn off and it should also turn off when there is no container or vessels.
- It can also be developed such that if any damage in pipeline it should detect and pass the information to the concern person.
- It can also be developed by adding GSM module and getting the information on your mobile device.

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Proceeding Of
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TITLE
ARDUINO BASED RADIOACTIVE TRACKING SYSTEM

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ABSTRACT:

There is a clear need to strengthen security measures to prevent any malevolent use or accidental misuse of radioactive sources. Some of these radioactive sources are regularly transported outside of office or laboratory premises for work and consultation purposes. This paper present the initial development of radioactive source tracking system, which combined Arduino microcontroller, Global Positioning System (GPS) and Global System for Mobile communication (GSM) technologies. The tracking system will help the owner to monitor the movement of the radioactive sources. Currently, the system is capable of tracking the movement of radioactive source through the GPS satellite signals. The GPS co-ordinate could either be transmitted to headquarters at fixed interval via Short Messaging Service (SMS) to enable real time monitoring, or stored in a memory card for offline monitoring and data logging.

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*I.*Introduction (*Heading 1*)

Radioactive sources provide great benefit to humanity through their use in agriculture, industry, medicine, andresearch. However, there is a growing concern that terrorist or criminal groups could gain access to high activityradioactive sources and use the sources maliciously [1]. Consequently, there has been a global trend towardsincreased control, accounting and security of radioactive sources to prevent their malicious use and any potentialassociated consequences [2][3][4]. Implementation of the security control elements is parallel with the Notice ofAdoption of the IAEA Code of Conduct (CoC) on the Safety and Security of Radioactive Sources.In line with the enforcement, the aim of this project is to develop and install a radioactive source trackingsystem, as a measure to ensure nuclear security. Some radioactive sources are regularly transported outside of theoffice or laboratory premises for fieldwork and consultation services. The system will be capable of trackingradioactive sources in real time through Global Positioning System (GPS) satellite signals and mobiletelecommunication networks. The tracking system will provides immediate alerts to the owner during anyunauthorized removal of radioactive source and helps to monitor the possession and movement of radioactivesources.Arduino is an open-source prototyping platform based on easy-to-use hardware and software [5][6][7][8].Arduino Uno and Arduino shields are used in the design and development of system as it provides ideal tool for rapid design development and prototyping especially for proof of concept. This paper presents the initial development of Arduino based radioactive source tracking system. The design focuses on integration of GlobaLPositioning System (GPS) and Short Messaging Service (SMS) for wireless on-line and off-line location tracking. The design hardware, software, as well as preliminary results will be discussed in this paper.Ease of Use

II. METHODOLOGY

Hardware of the System

The design of the system is divided into two parts; the transmitter and the receiver as shown in Figure 1. The transmitter will be attached to the casing of the radioactive source. Transmitter is the portable part of the system and powered by battery source. Its hardware consists of Arduino Uno as the controller board, GPS shield with

built-in Maintaining the Integrity of the Specifications

SD-card for position tracking and off-line data logging, detector module to record the dose rate data, and GSM shield for real time data transmission via SMS. The receiver section is used for monitoring and data logging. Receiver consists of a GSM modem to receive the SMS, and host computer with position mapping and data logging software.

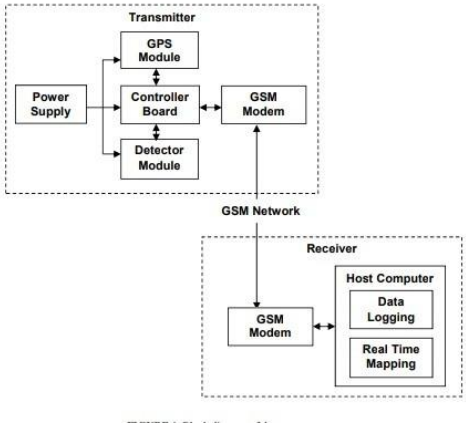

FIGURE 1. Block diagram of the system.

III. SOFTWARE OF A SYSTEM:

The heart of the system is the Arduino firmware of the transmitter that synchronizes the operation of GPS module, GSM module, and SD Card. Transmitter will send GPS data to host at a preset interval time. The flowchart of the firmware is shown in Figure 2.

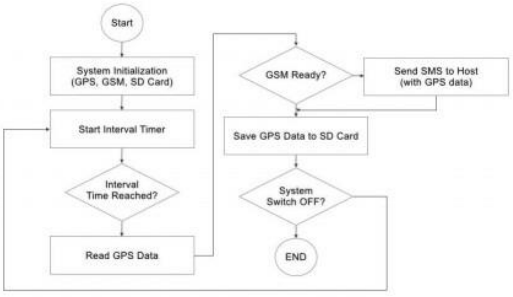

Fig.2 flowchart of transmitter firmware

Initialization of the system involves initialization of GPS, GSM, and SD Card. GPS module must fix to at least three satellites in order to read the latitude and longitude of the current location. Latitude and longitude of the location are the key data in this system. To avoid data loss due to problem such as GSM network coverage limitation, the data will also be recorded in SD card for off line monitoring.

IV. RESULTS AND DISCUSSION:

Currently, the system is capable of tracking the movement of radioactive source through the GPS satellite signals. The GPS co-ordinate could either be transmitted to host at fixed interval via Short Messaging Service (SMS) to enable real time monitoring, or stored in a memory card for offline monitoring and data logging. The online GPS mapping software for the receiver is still under construction. At the moment, location data is extracted manually from the SMS or from the SD card. GPS shield produces NMEA sentences that consists of several data such as time, date, number of satellite fixed, latitude and longitude, as well as travelling speed, angle, and altitude as shown in fig.3.

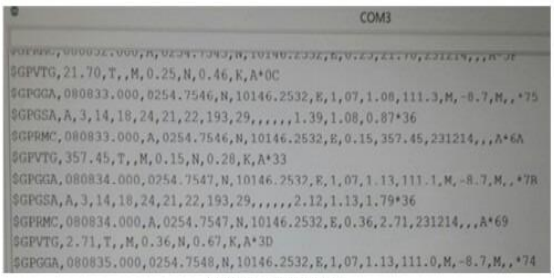

FIGURE 3. GPS NMEA Data.

Fig.3 GPS NMEA data

These data need to be parsed and extracted as the system will only records the time as well as location latitude and longitude. Example of single location mapping on Google Map is shown in Figure 4. This is done simply by manually entering the latitude and longitude of the location

on the website.arly state the units for each quantity that you use in an equation.

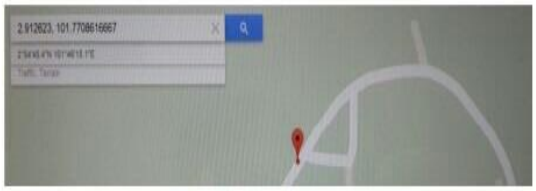

FIGURE 4. Single data location.

To create multileveled equations, it may be necessary The system has also been tested for continuous tracking. The result is shown in Figure 5 where the route of transmitter is highlighted by the red line. Data is recorded at one minute time interval. These prove that the Arduino based tracking system is working accordingly and capable to produce consistent and continuous data for the tracking system.

FIGURE 5. Continuous GPS data mapping for tracking system.

CONCLUSION AND RECOMMENDATIONS :

This paper concludes that an initial design for radioactive source tracking system has been successfully implemented by using Arduino UNO, GPS, and GSM shields. The system is able to provide real time or off line position data (latitude and longitude) via SMS and SD Card. The design process of the transmitter is simplified by using Arduino Uno, GPS, and GSM shields, as well as the library for the firmware. The next step is to test the integration of real time data with GPS mapping software to evaluate the reliability and the efficiency of the system.

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TITLE
DESIGN OF FULL ADDER USING DUAL-RAIL DOMINO LOGIC

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ABSTRACT:
This mini project comprises the Performance analysis of different types of Primitive Gates comparing with Full adder and its characteristics. Adder is used to do an arithmetic operation, like addition, multiplication, accumulation etc., Likewise, there is N number of adders are available with specific characteristics. Based on these adders are divided into three categories comparing to other adder, Full Adder gives a best performance in slicing, area consumption and delay. This can shows a best result in simulation by occurs moderate power consumption and less delay of designing high speed applications, In upcoming sessions we are going to discuss about the different types of Primitive Gates and my new proposal along with simulation results of all Primitive Gates and Full Adder Circuit by Dual-Rail Domino Logic.

DESIGN OF FULL ADDER USING DUAL-RAIL DOMINO LOGIC

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INTRODUCTION:

Domino logic can only implement monotonic functions, and many important logic functions, such as almost all arithmetic functions, are non-monotonic. In fact, non-monotonic functions can be implemented using domino logic by simply computing both polarities of each signal. Such circuits are called dual-rail because each logical variable is represented by two wires, one that goes high if the signal is true and one that goes high if the signal is false, with this encoding, an input variable going true can cause an output variable to go true or false (non-monotonic behaviour), and yet all signals are montonically rising. Such dual-rail domino circuits represent one of the fastest ways to implement a given logic function and thus are widely used today in the arithmetic units of the fastest microprocessors.

FULL ADDER:

Due to rapid growth in digital world such as mobile phones, computers, laptops etc. which need to have low power consumption, high performance with less amount of delay[3]. Full adder is core block for the circuits which performs arithmetic operations (addition, subtraction, multiplication & division). Hence the system's performance is based on the performance of the full adder [4]. So realizing full adder with the parameters such as low power and with high speed performance is important. Thus increasing the performance of the full adder will increase the system's performance [5].

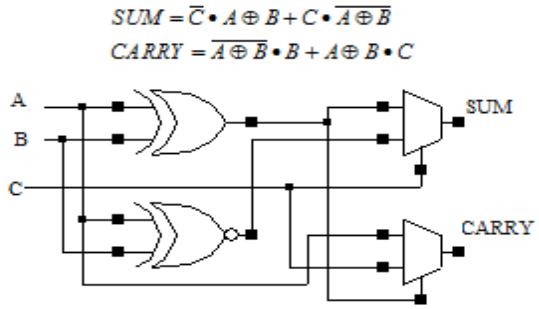


fig 1 FULL ADDER

In above fig 1 shows gate level representation of Full adder, which is consist of XOR gate, XNOR gate and two multiplexers which gives the output (i.e.) (sum, carry)

Usually XNOR and XOR gates are used to design full adders [6]. But XOR and XNOR gates consumes more power. By reducing the power consumption of the XOR and XNOR gate we can reduce the power consumption of full adder.

The major constrain for most of the systems is power consumption [7]. In low voltage or low power applications, the optimization of speed and power is the biggest issue. These issues can be tackled by using GDI (gate diffusion input) technique. Hence the power and speed issue can be overcome by designing full adder using GDI (gate diffusion input) technique.

The major operation of all devices is arithmetic operation (addition, subtraction, multiplication and division). Full adder is most widely used for arithmetic operations [8].E.g.) computers, laptops, smart watches, mobile phones etc.

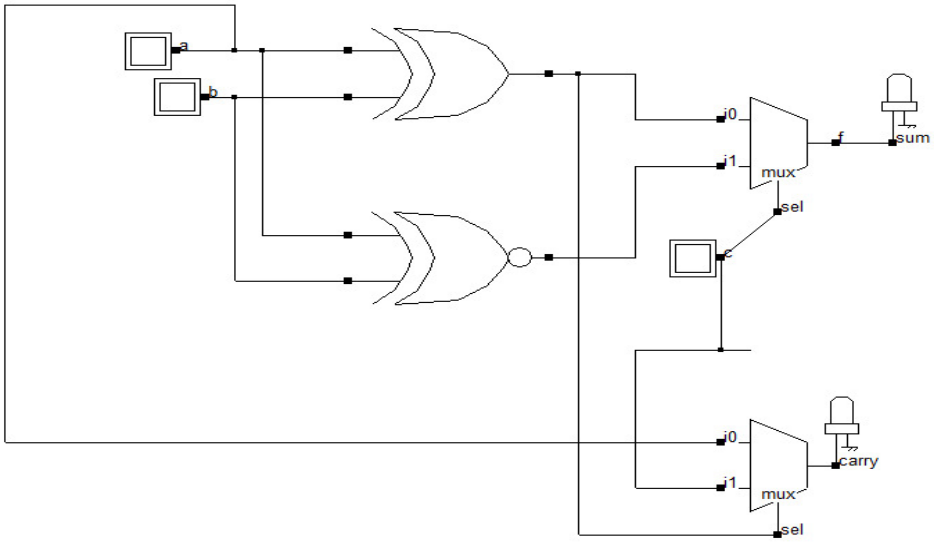
DESIGN OF FULL ADDER:

The basic circuit which we have taken is shown below we use this circuit to design a full adder by using Dual-Rail Domino realization. We have taken XOR-XNOR-MUX Full adder. Full adder is a logical circuit that performs an addition operation on three binary digits. It contains A,B,C as input and sum, carry as output. The representation of full adder is shown below.

The sum and carry expression is given as

1. **sum=(A⊕B).C'+(A⊕B)' .C**
2. **carry=A.(A⊕B)'+C.(A⊕B)**

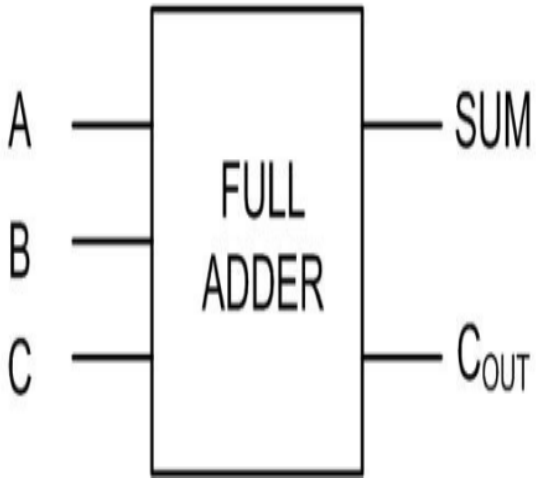
FULL ADDER CIRCUIT:



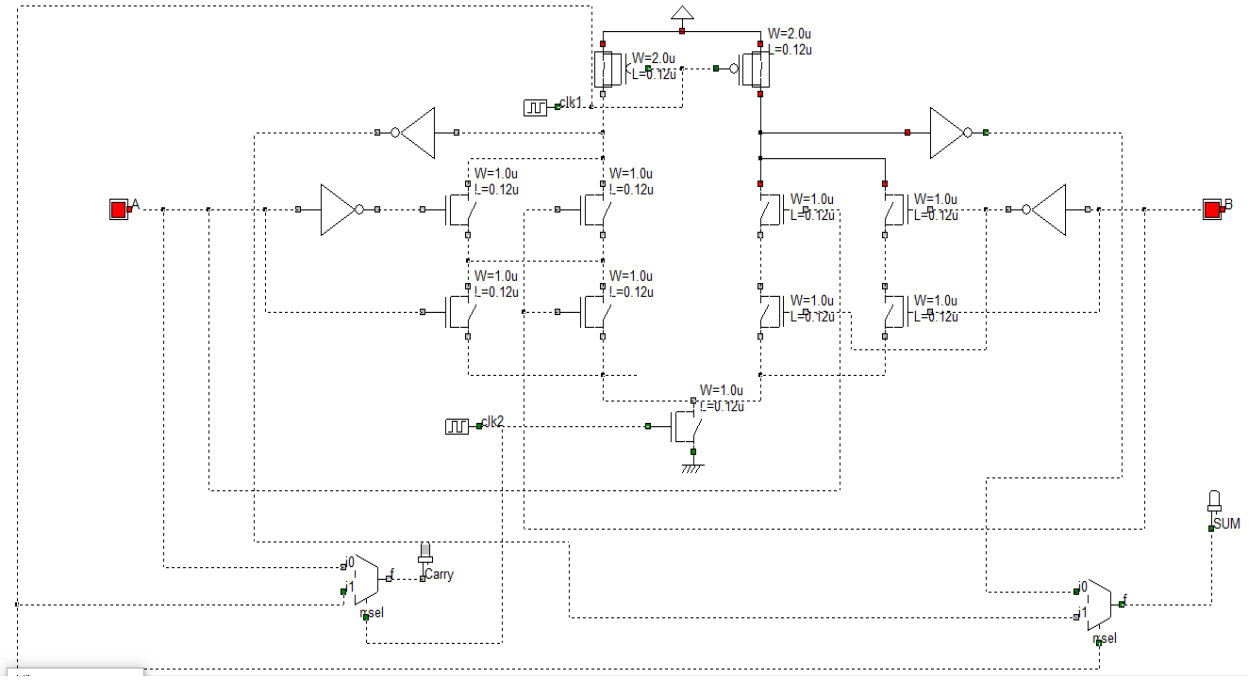
The input is a, b, c and the output is sum and carry. The circuit consists of XOR and XNOR gate with two multiplexers and the output of the multiplexers is taken as sum and carry[9] .

TRUTH TABLE

Input			Output	
A	B	Cin	Sum	Carry
0	0	0	0	0
0	0	1	1	0
0	1	0	1	0
0	1	1	0	1
1	0	0	1	0
1	0	1	0	1
1	1	0	0	1
1	1	1	1	1

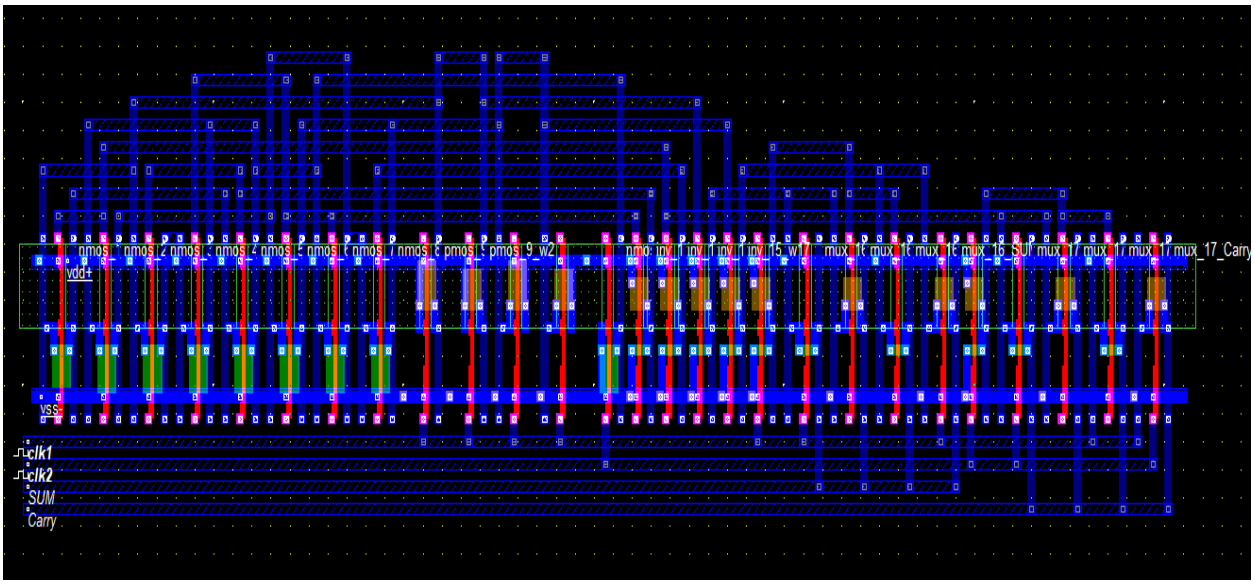


Output1:

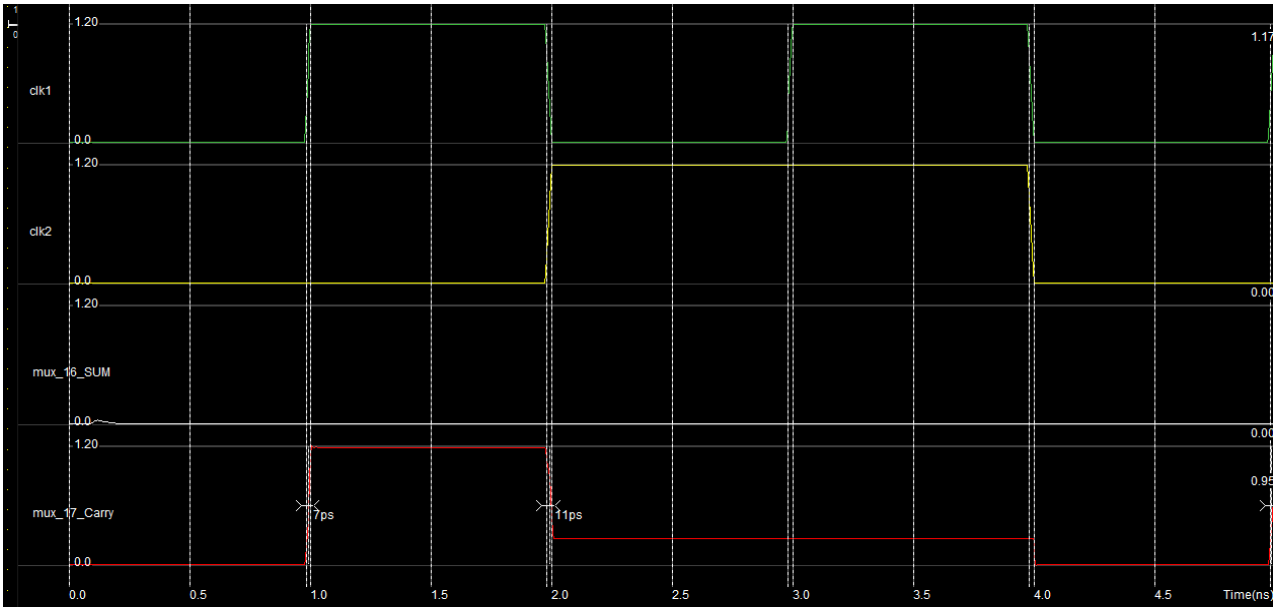


MASK LAYOUT DESIGN:

The physical mask layout of any circuit is manufactured using a particular process to a set of confine geometry; the main objective of design rules is to achieve a high overall yield and reliability.



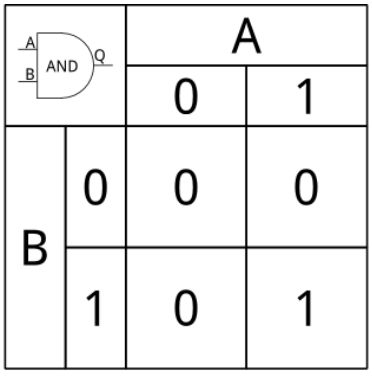
Output2:



SIMULATION OF PRIMITIVE GATES:

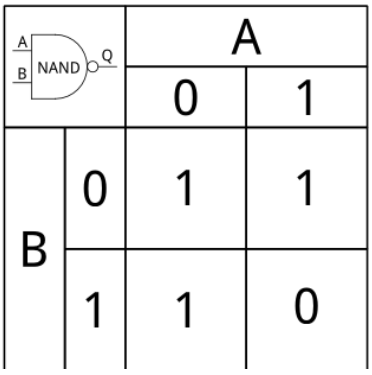
IMPLEMENTATION AND/NAND

The *AND gate* is so named because, if 0 is called "false" and 1 is called "true," the gate acts in the same way as the logical "and" operator. The following illustration and table show the circuit symbol and logic combinations for an AND gate. (In the symbol, the input terminals are at left and the output terminal is at right.) The output is "true" when both inputs are "true." Otherwise, the output is "false." In other words, the output is 1 only when both inputs one AND two are 1. The *NAND gate* operates as an AND gate followed by a NOT gate. It acts in the manner of the logical operation "and" followed by negation. The output is "false" if both inputs are "true."



B \ A	0	1
0	0	0
1	0	1

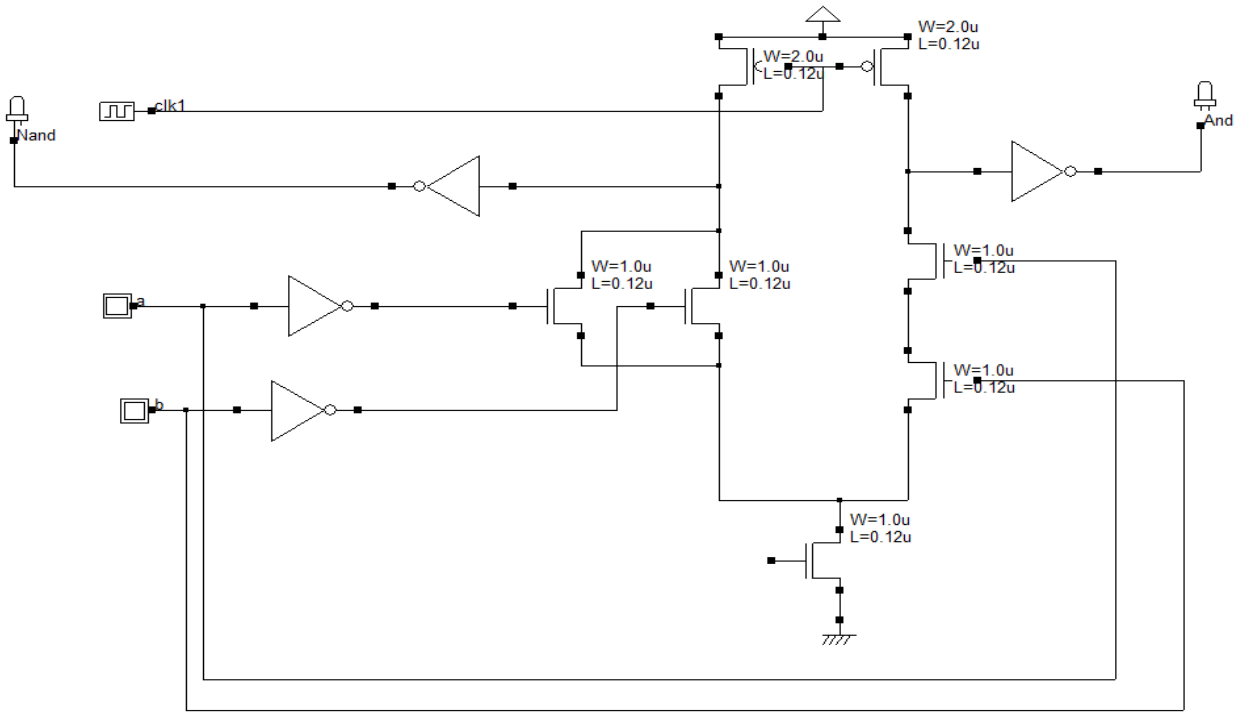
Fig: AND TRUTH TABLE



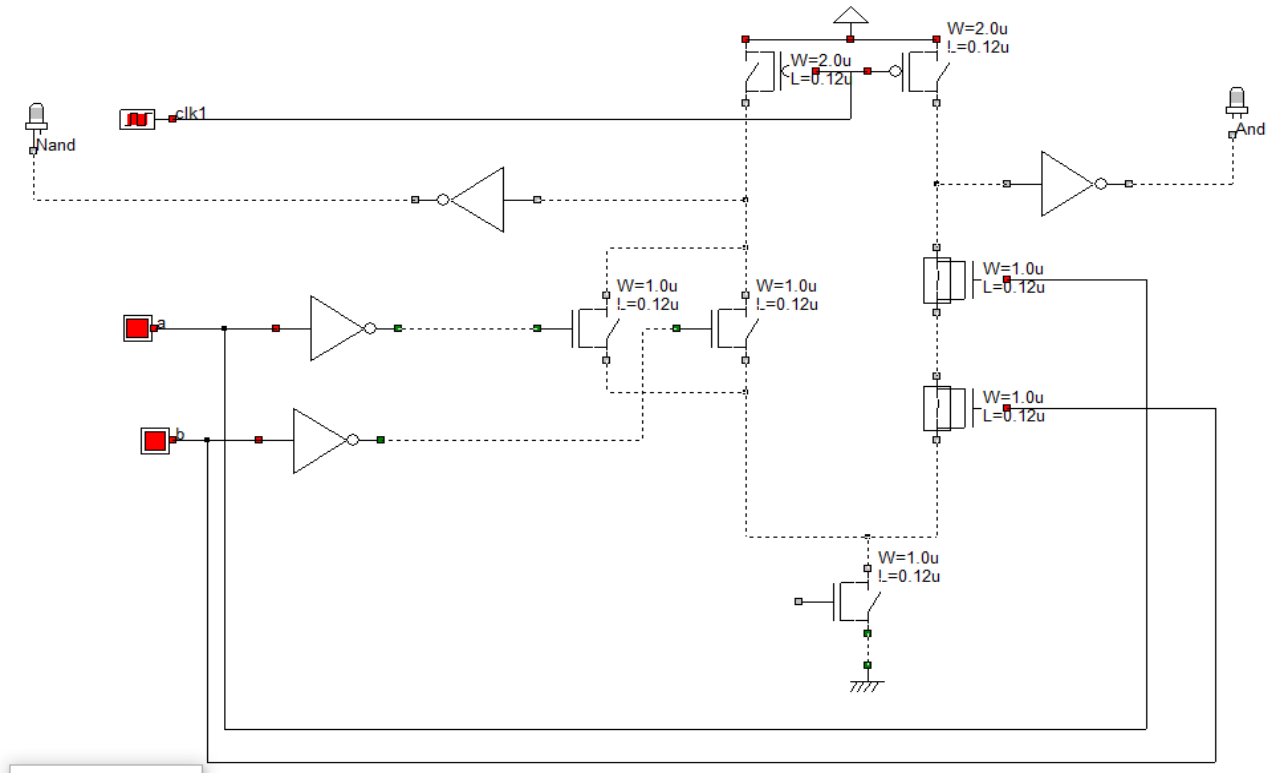
B \ A	0	1
0	1	1
1	1	0

Fig: NAND TRUTH TABLE

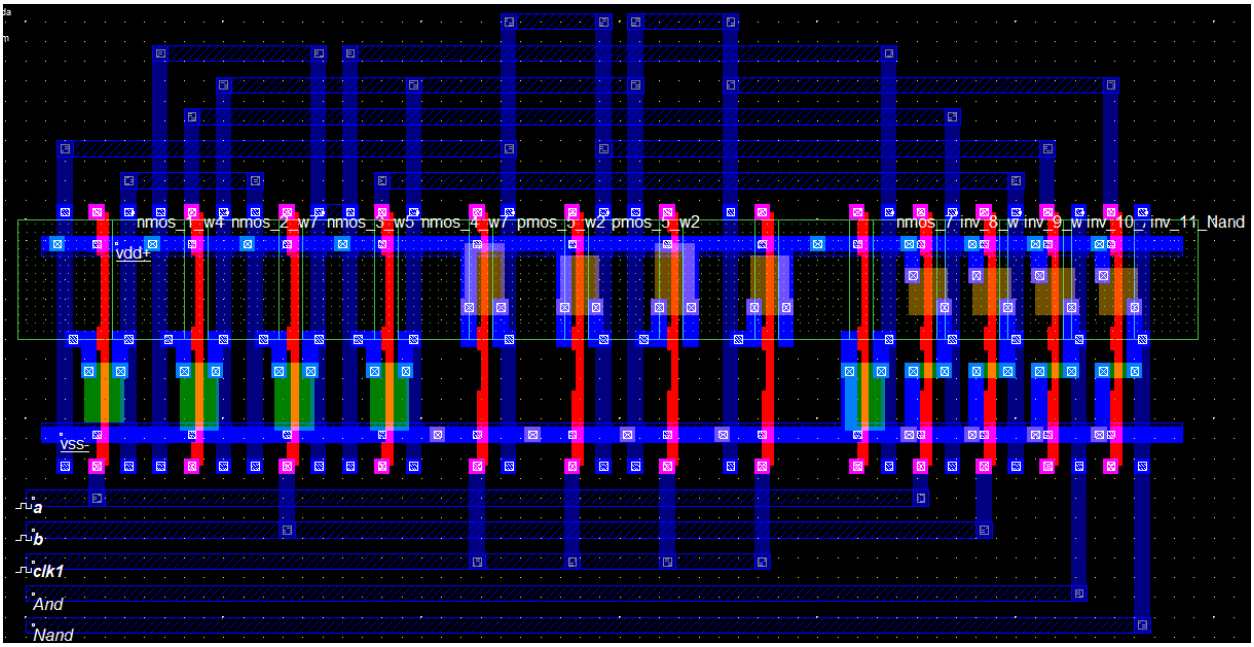
SCHEMATIC DIAGRAM



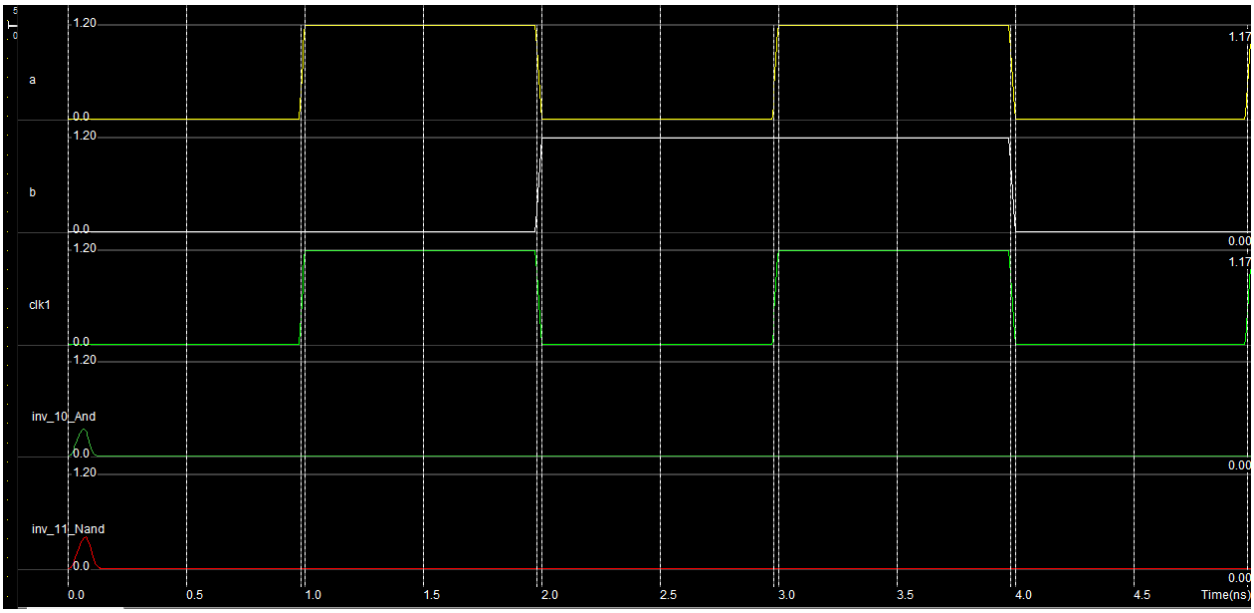
OUTPUT1:



MASK LAYOUT DESIGN:


nmos_1_w4 nmos_2_w7 nmos_3_w5 nmos_4_w7 pmos_0_w2 pmos_1_w2
nmos_7_inv_8_w inv_9_w inv_10_ inv_11_Nand
vdd!
vss!
a
b
clk1
And
Nand

OUTPUT2:


a
b
clk1
inv_10_And
inv_11_Nand
1.20
0.0
1.17
0.00
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
Time(ns)

 ISBN: 978-93-5406-440-1

IMPLEMENTATION OR/NOR

The *OR gate* gets its name from the fact that it behaves after the fashion of the logical inclusive "or." The output is "true" if either or both of the inputs are "true." If both inputs are "false," then the output is "false." In other words, for the output to be 1, at least input one OR two must be 1. The *OR gate* gets its name from the fact that it behaves after the fashion of the logical inclusive "or." The output is "true" if either or both of the inputs are "true." If both inputs are "false," then the output is "false." In other words, for the output to be 1, at least input one OR two must be 1.

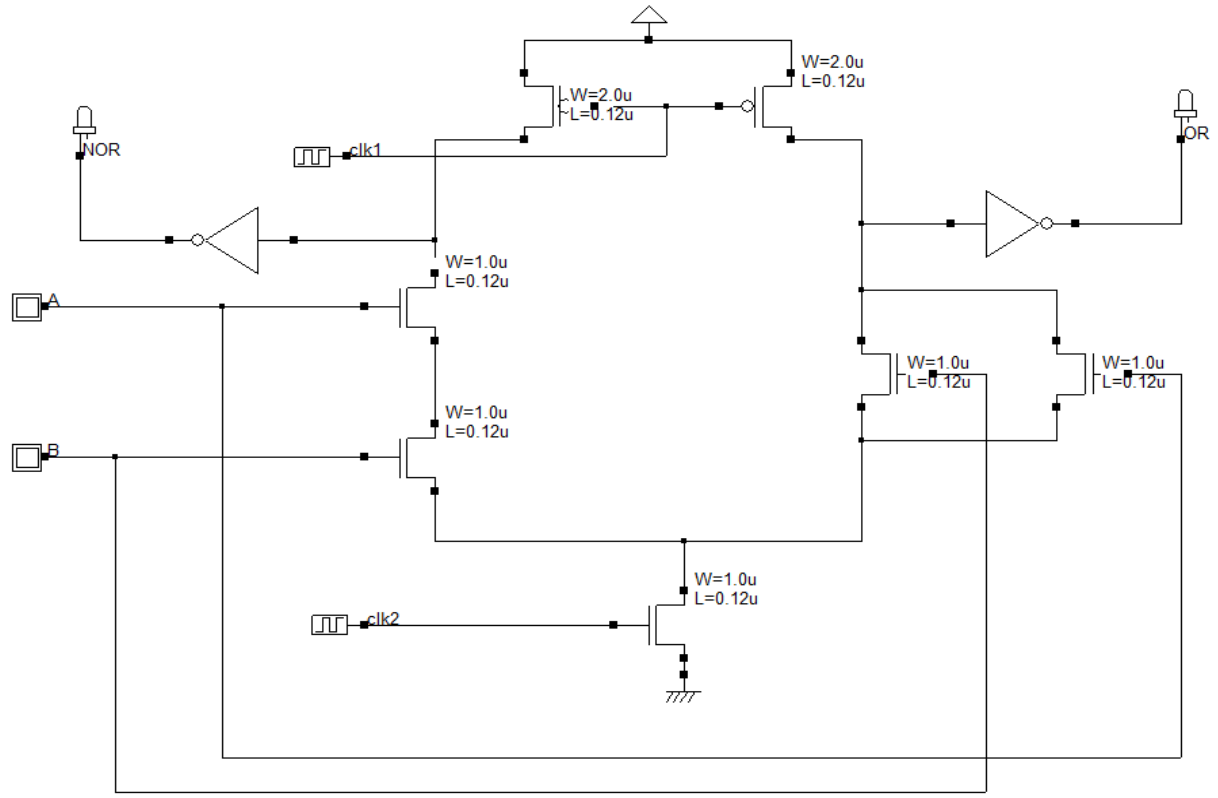
A B OR Q	A	
	0	1
B 0	0	1
B 1	1	1

Fig: OR TRUTH TABLE

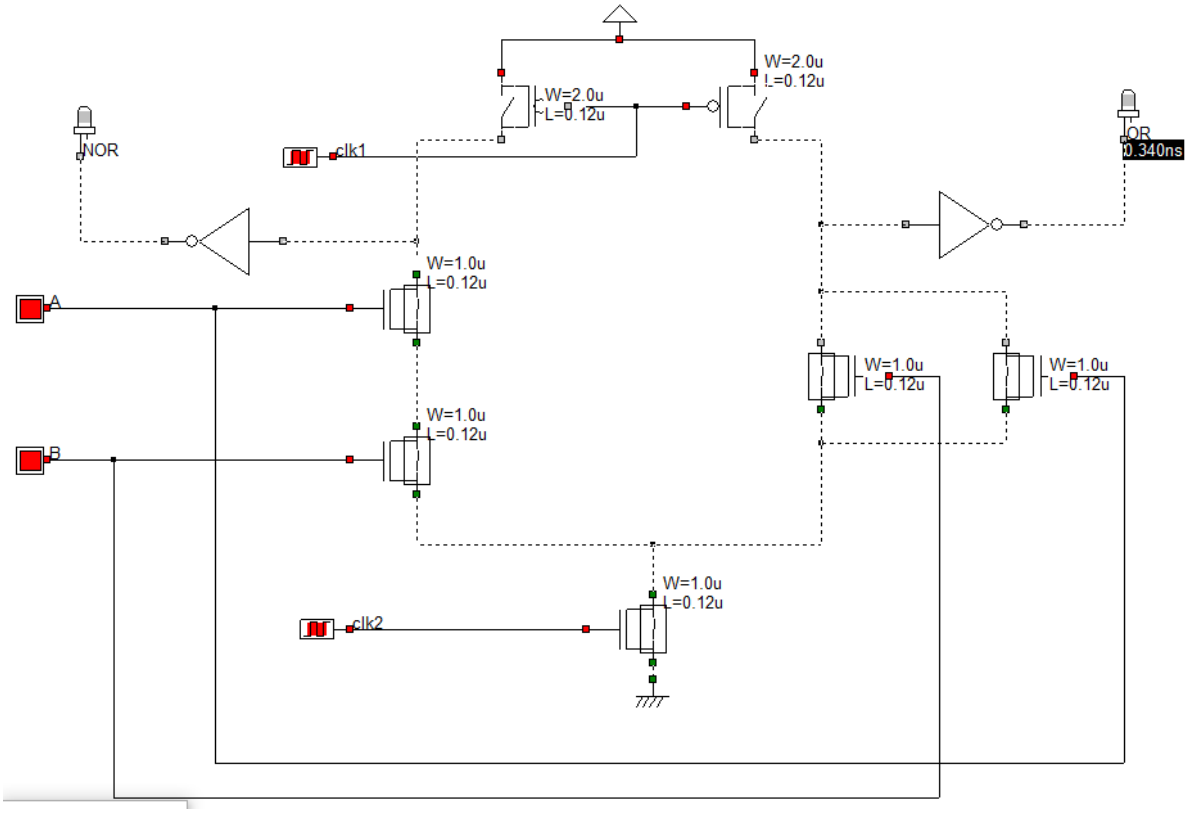
A B XOR Q	A	
	0	1
B 0	0	1
B 1	1	0

Fig: NOR TRUTH TABLE

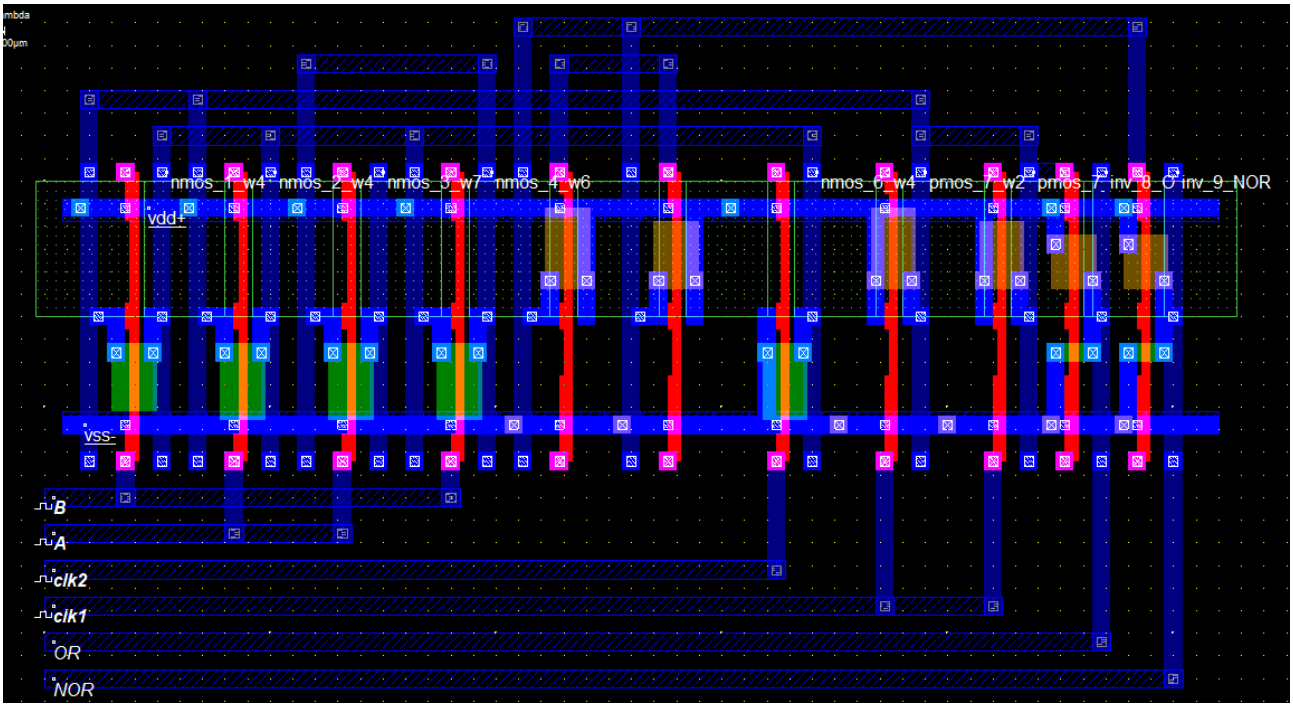
SCHEMATIC DIAGRAM


W=2.0u
L=0.12u
W=2.0u
L=0.12u
NOR
clk1
OR
W=1.0u
L=0.12u
A
W=1.0u
L=0.12u
W=1.0u
L=0.12u
W=1.0u
L=0.12u
B
W=1.0u
L=0.12u
clk2

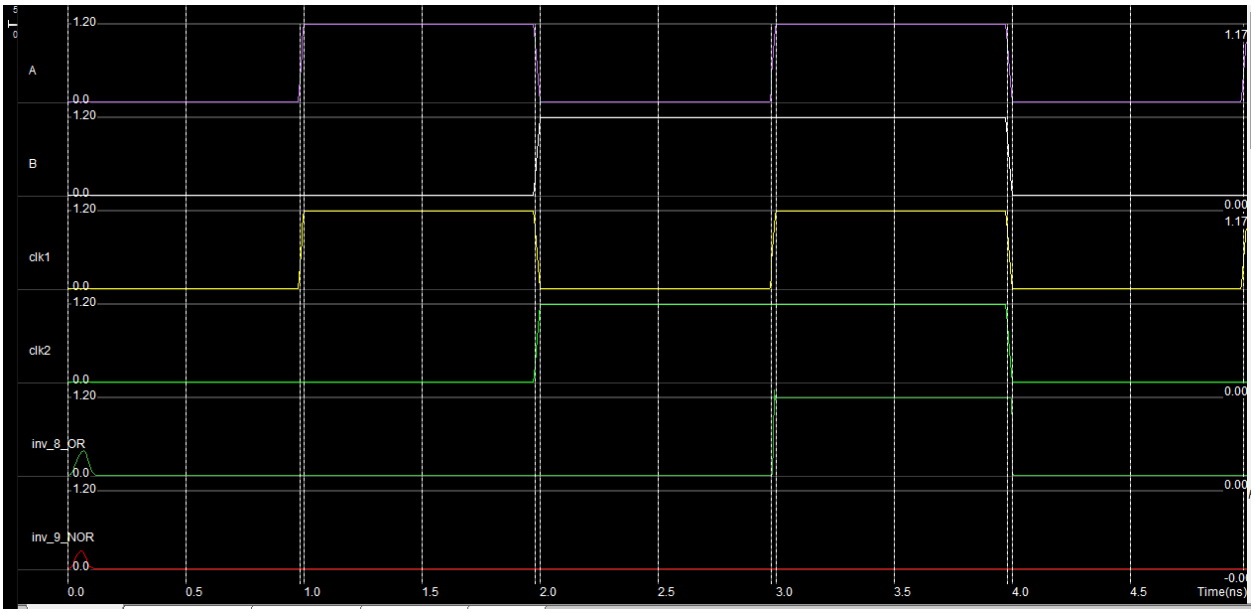
OUTPUT1:


W=2.0u
L=0.12u
W=2.0u
L=0.12u
NOR
clk1
OR
0.340ns
W=1.0u
L=0.12u
A
W=1.0u
L=0.12u
W=1.0u
L=0.12u
W=1.0u
L=0.12u
B
W=1.0u
L=0.12u
clk2

MASK LAYOUT DESIGN:



OUTPUT2:



IMPLEMENTATION XOR/XNOR

The *XOR* (*exclusive-OR*) *gate* acts in the same way as the logical "either/or." The output is "true" if either, but not both, of the inputs are "true." The output is "false" if both inputs are "false" or if both inputs are "true." Another way of looking at this circuit is to observe that the output is 1 if the inputs are different,

but 0 if the inputs are the same. The *XNOR (exclusive-NOR) gate* is a combination XOR gate followed by an inverter. Its output is "true" if the inputs are the same, and "false" if the inputs are different

A B XOR Q		A	
		0	1
B	0	0	1
	1	1	0

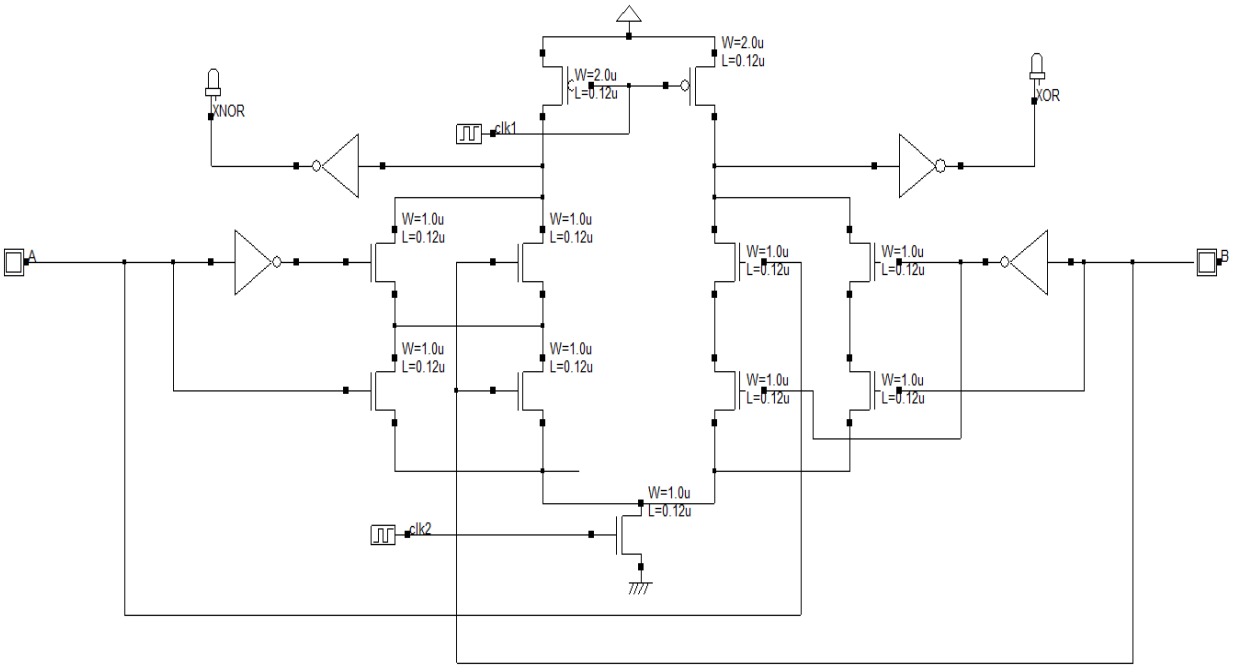
Fig: XOR TRUTH TABLE

INPUT		OUTPUT
A	B	C
0	0	1
0	1	0
1	0	0
1	1	1

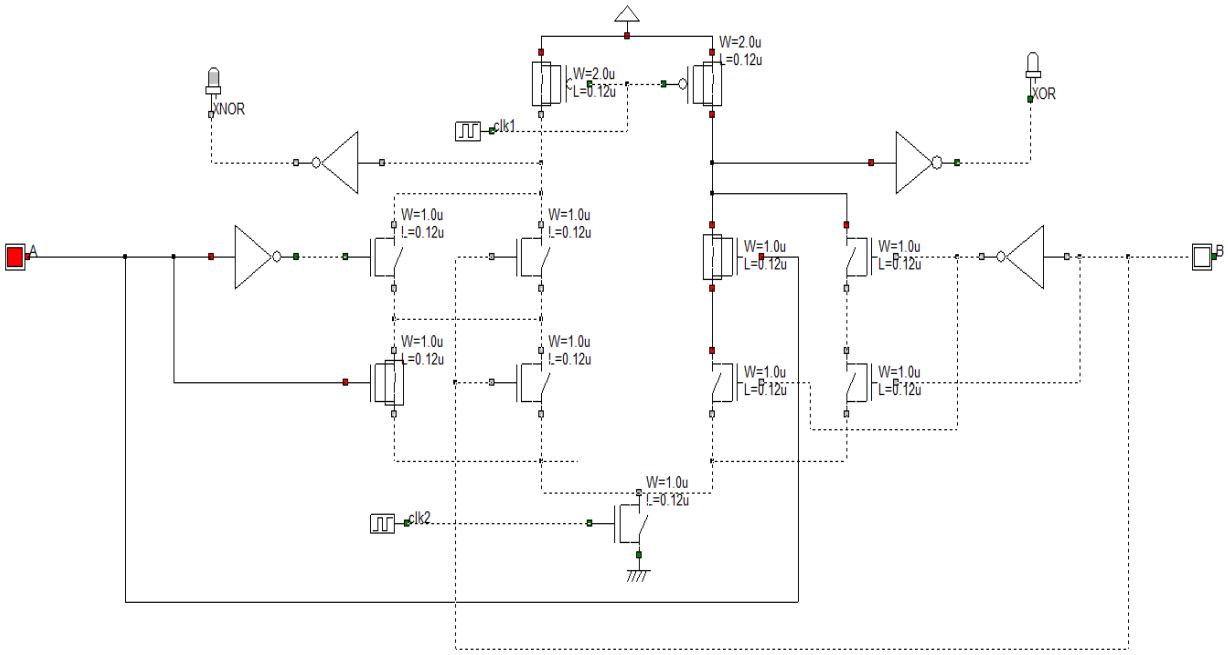
Truth Table

Fig: XNOR TRUTH TABLE

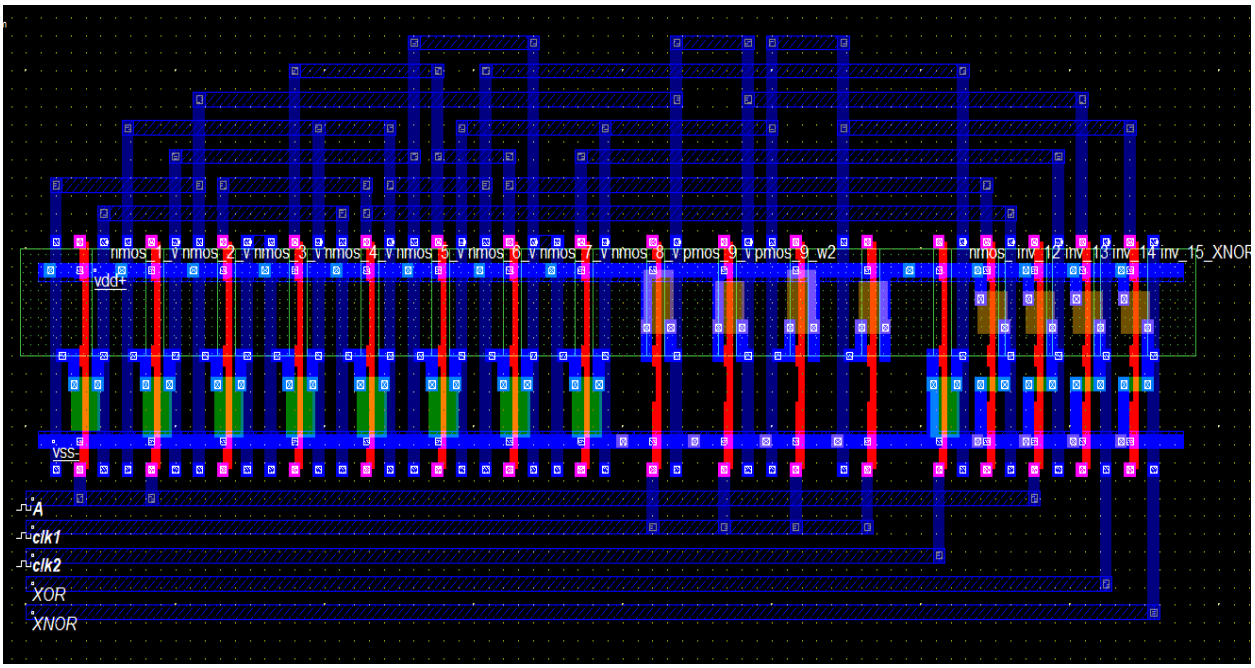
SCHEMATIC DIAGRAM



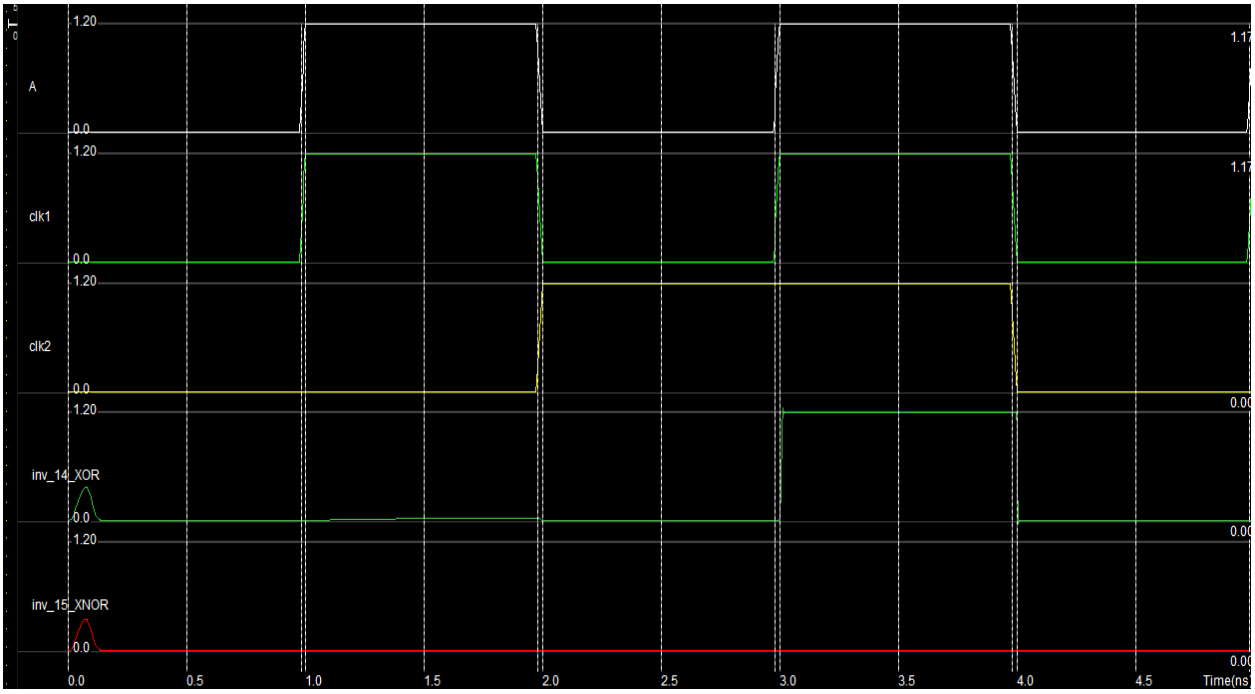
OUTPUT1:



MASK LAYOUT DESIGN:



OUTPUT2:



PERFORMANCE ANALYSIS TABLE:

Gate type	Rise time	Fall time	Total time Period	Power Consumption	Total number of Transistors used in a circuit
AND/NAND	16Ps	16Ps	32Ps	13.56 mW	15
EXOR/EXNOR	0.590ns	0.590ns	1.180ns	14.381 µW	19
OR/NOR	0.340ns	0.340ns	0.680ns	0.169mW	11
EXOR/EXNOR in FULL ADDER	7Ps	11Ps	18Ps	12.181mW	19

CONCLUSION:

In This Mini-Project the characteristics of Primitive Gates like the power consumption, area, delay, Total Number of Transistors in gate circuit has been analysed. Delay is a major drawback for VLSI design hence an optimization of various circuits.Thus full adder design Using Dual-Rail Domino logic is used in various applications such as digital signal processing, microprocessors and other processor circuits. Thus we conclude that Dual Rail Domino Logic Circuit is the most efficient and optimized method for circuit design..

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PROCEEDING OF
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25 TH AND 26 TH JUNE 2020

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TITLE

Agro Online Shopping Using Web Application

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ABSTRACT:

Nowadays the person can buy all the things in online from his or her home itself. But the farmer cannot buy anything in the online because. Some of the agriculture product are not available in online store by this problem, we create the agro product online store, in this application every product is available with price and detail. Also, by this, the farmer can order all the agriculture product Fertilizer from his home itself. Because of this the farmer can save her Time by standing the offline store and search every store. This web application is perfect for all farmers.

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Agro Online Shopping Using Web Application

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ABSTRACT--Nowadays the person can buy all the things in online from his or her home itself. But the farmer cannot buy anything in the online because. Some of the agriculture product are not available in online store by this problem, we create the agro product online store, in this application every product is available with price and detail. Also, by this, the farmer can order all the agriculture product Fertilizer from his home itself. Because of this the farmer can save her Time by standing the offline store and search every store. This web application is perfect for all farmers.

Keywords- *Android SDK, MySQL, PHP*

INTRODUCTION:

The Online business permits clients to electronically trade products and ventures with no boundary of time or distance. The Mobile Commerce or m-Commerce is the purchasing and selling of goods and services through wireless handheld gadgets, for example, mobiles and tablets. It is known as next generation e-commerce. Online shopping is a type of ecommerce which permits clients to directly purchase goods or services from a merchant over the internet using a web browser.

Online shopping has two types of process,

1. Business-to-Consumer (B2C)
2. Business-to-Business (B2B)

The online shopping system has the shopping cart which permits the customers to create a list of items to be purchased. At the time of checkout, the total is calculated for the items list in the shopping cart, including shipping and handling charges and the associated taxes as applicable. This project is of type one process i.e.- Business-to-Consumer because the products are sold directly to the customers. Traditional shopping is a tedious and time-consuming job. Although the growing trend of online shopping has reduced some load, there is still some difference in actually going to shops and hand-picking products to get the feel of their quality and features that cannot be experienced online. Customers also feel worried to carry out online purchases due to fear of less secure transaction process that may lead to hacking of user's sensitive data, insecurity of credit/debit cards, unreliability or breach of privacy. The project aims at removing flaws of both kinds of shopping and bridge the gap between physical and a virtual world.

"Web design platform was built from the ground up with the explicit goal to be the first free platform, open and complete

plat form created specifically for mobile devices."

Android platform is an open framework and is allowed to use by anybody. A mobile handset manufacturer can utilize android in the event that they take after the assertion expressed in the

Software Development Kit (SDK). There are no limitations or prerequisite for the handset manufacturer to impart their expan- sions to any other person as they are in another open source programming in the event that they leave the Linux kernel as it seems to be. The Linux kernel is under an alternate and more confined permit than Android.

Android platform is a product situation and not an equipment stage, which incorporates an Operating System, based on Linux portion based OS facilitating the Dalvik virtual machine. The Dalvik virtual machine runs Android applications as occasions of the virtual machine. Android contains a rich user interface (UI), application structure, java class libraries and sight and sound support. Android additionally accompanies worked in applications containing elements, for example, short message benefit (SMS) usefulness (informing), telephone abilities (calling) and an address book (contacts).

II.RELATED WORKS

A.AN EFFECTIVE AGRICULTURE MARKETING BY USING ANDROID BASED

APPLICATION: Agriculture serves the most basic task of providing adequate food supplies for mankind. In order to accomplish this task, the economy of the farmer has to be met. Agriculture marketing is one of the best solutions to fulfill the task. It involves the purchasing of agricultural products from farmers. Some farmers are unaware about the commodity prices and sell their products at low prices to the third-party vendors each result in huge loss for the farmers. To overcome this kind of situation, an android application for agricultural marketing that provides better knowledge about the commodity prices of current marketing strategies at different places. It helps to find the buyers and appropriate sellers. It also helps the farmers to choose the best location of the market to sell the products. The mobile application is constraint to particular markets within the mobile phone. Since there are multiple markets the prices may vary for particular product. As the number of farmers who sell the product are also different. Their price and quantity constraints differ from others. Mobile application will be constrain by the capacity of the data base, it may be forced to queue incoming requests which increases the time to fetch the data. We developed a data flow diagram for developing mobile app which is a graphical tool used to describe and analyze movement of data through a system. These are the central tools and the basis from which the other components are developed. The transformation of data from input to output, through processed, may be described logically and independently of physical components associated with the system. These are known as the logical dataflow diagrams. The physical data flow diagrams show the actual implementation and movement of data between people, departments and work stations. A full description of a system actually consists of a set of data flow diagrams. Each component in a DFDis labeled with a descriptive name. Process is further identified with a number that will be used for identification purpose. The development of DFD'S is done in several levels.

B. MOBILE APPLICATION FOR THE AGRICULTURAL MANDI USINGE-

AUCTION: The Big Data analytics allude to the investigation of huge datasets gathered from different data sources, the Big Data plays very important role to discover extremely helpful data from the huge collection of datasets. The e-mandi business as of now utilizing the idea of Cloud Computing and Big Data specially to find helpful data. As an agrarian nation, India needs a created horticultural field, enabling the farmers and utilizing the advances, for example, e-agriculture, web-based promoting which can build up a solid economy. The proposed android e-auction system helps the famer to access the wide market portal across the world. This framework removes the problem of middlemen because of which famers don't get the right amount for their yield. So, through this framework farmer can sell their product through bidding system where there is possibility of getting very nice price for their product. The facilities of advertisement of the

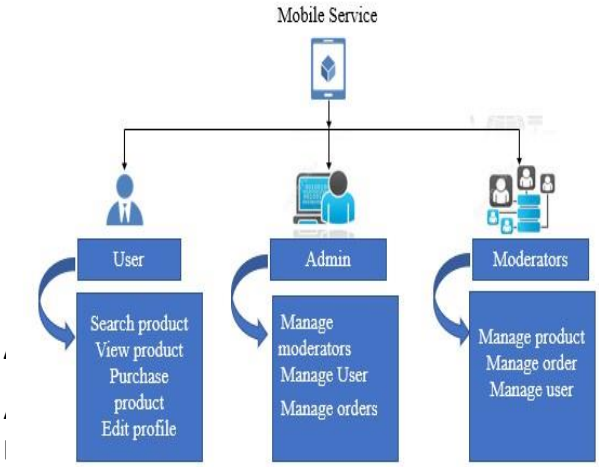
agricultural products, their worldwide marketing systems brings customer through every corner of the world. The paper centers around the Agricultural space especially Indian Agricultural framework which has been escaped these developing advancements, the proposed paper makes the utilization of Big Data Analytics to the agricultural area. The paper proposed show how farmers can utilize e-auction application to sell crop sand provides various information about the generation subtle elements. proposed a framework that removes the broker between farmer and market and farmers can apply new methods from the specialists through this framework. This framework gives stage to the agriculturists where they can know the costs of various markets and can offer their harvest in light of the need, the request determining for a specific harvest is done subsequently helping the agriculturist.

C.MODERN AGRICULTURE EVELOPMENT SYSTEM USING ANDROID APPLICATION:

It is mainly used for providing the agriculture related information and solving the problem related to agriculture. User can able to grow the number of plants in their home by using this information. The user should need proper guidance information to cultivate their agriculture land. Modern agricultural systems contain the details of fertilizer, soil, climate, crop rotation, and genetic manipulation of crop plants and etc. In addition, a digital signature algorithm may be used to detect whether or not the information was modified after it was signed. REST API architecture will be useful to build client/server network applications. REST API will be good architectural option to do the communication between the app and the server. The work of fertilizer in agricultural production has been key to the development of these practices. It contains all the information to grow plants. The information is divided into category wise such as cattle, crop protection, vegetables, grains and etc. English category information is also included in this application. The query communication between the user and admin can be performed in this system. User can gather the information to increase the production. User can clarify their quires about the agriculture by using this system. By using this system, the growth of plants will be increased in residential areas. The system can be shared via social network services. Reviews and comments are added to know how long it was reached the user. User can login to the application with social media Facebook, twitter, Google+. It is a web based and mobile application. Modern agricultural development systems used for providing the suggestion to the user about agriculture. This system raises the agriculture as modern technology in the future. The proposed system provides information about agriculture, such as to increase the growth rate of plant production. User can able to grow the number of plants in their home by using this information. The user should need proper guidance information to cultivate them agriculture land. Modern agricultural systems contain the details of fertilizer, soil, climate, crop rotation, and genetic manipulation of crop plants, etc. The work of fertilizer in agricultural production has been key to the development of these practices. It contains all the information to grow plants.

SYSTEM ARCHITECTURE AND MODULES A. SYSTEM ARCHITECTURE:

System Architecture is the diagrammatic representation of the project. It scenario shows sequence of process for each actor and described in the whole environment of this project.



of the

i) ADMIN PROCESS: The admin should know the prior knowledge about the over environment. The admin will pre-process the whole environment for the complete navigation for the user adding the block details and exit.

And admin navigate the user.

- Manage Moderators

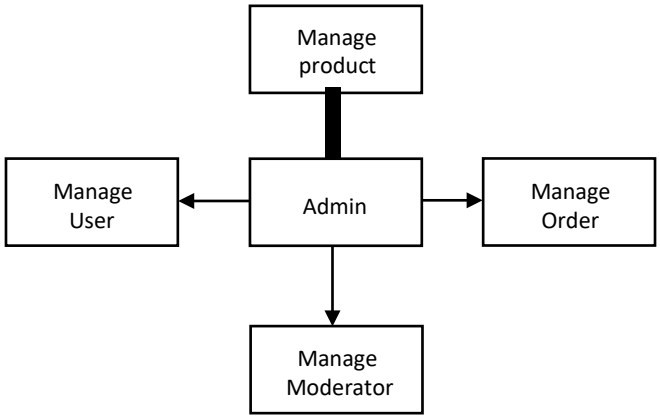


Fig 1.1 a) Admin Module

MANAGE MODERATORS: Only admin is having the privilege to add a moderator. A moderator can be considered as a staff who manages the orders or owner of a group of products. Admin can restrict a moderator from managing the orders by blocking them. Admin can unblock a blocked user if needed. Admin has privilege to delete a moderator who was added.

ii) MODERATORS PROCESS: A moderator is considered as a staff who can manage orders for the time being. As a future update moderator may give facility to add and manage his own products. Moderators can reduce the work load of admin. Now moderator has all the privilege an admin having except managing other moderators. He can add products and users. He can also check the orders and edit his profile.

- Manage products
- Manage orders

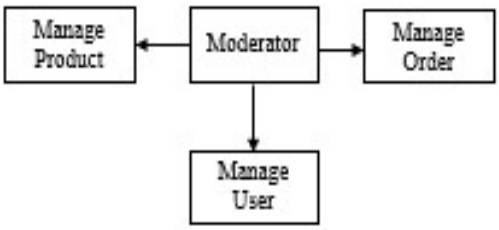


Fig 1.2 a) Moderator Module

MANAGE PRODUCTS: A moderator is considered as a staff who can manage orders for the time being. As a future update moderator may give facility to add and manage his own products. Moderators can reduce the work load of admin. Now moderator has all the privilege an admin having except managing other moderators. He can add products and users. He can also check the orders and edit his profile.

MANAGE ORDER: Moderator can view the Orders which is generated by the users. He can verify the details of the purchase. Moderator can delete order from the orders list when the product is taken for delivery.

MANAGE USER: The Moderator will have a list view of all the users registered in the system. Admin can view all the details of each user in the list except password. Moderator has privileges to add a user directly by providing the details. Moderator has a right to delete or block a user. The default status of a new user registered is set as blocked.

iii) USER PROCESS: A new user will have to register in the system by providing essential details in order to view the products in the system. A user must login with his user name and password to the system after registration. User can view the list of products based on their names after successful login. A detailed description of a particular product with product name, products details, product image, price can be viewed by users. Users can search for a particular product in the list by name. In the history the user will have a view of pending orders. The user can view and edit the profile.

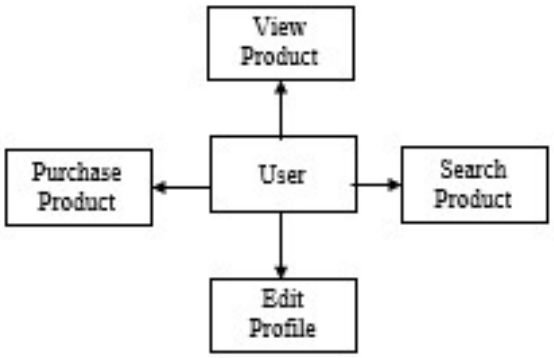


Fig 1.3 a) User Module

IV.CONCLUSION AND FUTURE ENHANCECMENT:

The system has been developed with much care and free of errors and at the same time it is efficient and less time consuming. The entire system is secured. Also the project helped us understanding about the development phases of a project and software development life cycle. We learned how to test different features of a project. This application which can be implemented to any nearby shops or branded shops selling various kinds of products by simple modifications. A number of features can be added to this system in future like providing moderator more control over products so that each moderator can maintain their own products. System may keep track of history of purchases of each customer and provide suggestions based on their history. In future enhancement is to develop the multiple language.

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PROCEEDING OF

NATIONAL E-CONFERENCRE ON HARDWARESECURITY
Conducted on
25 TH AND 26 TH JUNE 2020

Paper Code
NCHS202003136

TITLE

REAL –TIME HAND GESTURE RECOGNITION ROBOT

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ABSTRACT:

The major human interaction model is non touched computer aided model is hand gesture recognition. We communicate with robot in sign language that may be used by all kinds of people. Moreover, we find difficulties in hand gesture recognition. On this point, we designed a hand gesture robot the safety of humans and the robot is focused; the robot is equipped with special range sensors that help in avoiding the obstacles in the field by specifically detecting the position of obstacles. For the fabrication of the project, a special type of prototype made of lightweight temperature resistant metal is used to carry all objects. This paper demonstrates the problem and effects of landmines in defense fields. We are proposing a robot that has the aptitude to detect the buried mines and lets user control it wirelessly to avoid human causalities This technique has the practical benefit of reducing the number of casualties, after the implementation of the technique, the robot can be controlled efficiently and it robustly determines the position of the obstacle.

REAL –TIME HAND GESTURE RECOGNITION ROBOT

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that may be used by all kinds of people. Moreover, we find difficulties in hand gesture recognition. On this point, we designed a hand gesture robot the safety of humans and the robot is focused; the robot is equipped with special range sensors that help in avoiding the obstacles in the field by specifically detecting the position of obstacles. For the fabrication of the project, a special type of prototype made
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Keywords-Human interaction, Hand gesture, landmines, wireless communication

I.INTRODUCTION

Robot is used to finish work in unsafe or critical zones and it is used in managing some levels that are unstable. It is used in various fields such as metropolitan areas, and also defense fields. A small variety of robot's applicator is used in completion of work. The large robots are utilized for the usage of work that is unsafe and harmful for human beings. For example, controlling heavy automated vehicles, critical operations and soon.

The robot is utilized for searching the metal objects that are covered up in the ground. The bomb disposing specialists use the metal detectors especially in the defense fields the bomb is not used. The metal detectors are also used by the electrical cable that is hidden in the walls[1]. At airports the metal detectors are used to scan the

passengers such as fire arms and cuts. In the archaeological department used to find treasures, old coins and metal detectors are frequently used. In food industries they used to find minute metal pieces in the foodsubstance.

This paper mainly focuses on developing and designing the robotic vehicle that can able to sense and detect metal as detecting the land mines. A metal detector has a circuit that is interfaced to the control unit that detects the suspected metal ahead. The circuit of the metal detector is mounted with the robotic vehicle where the detection of metals is performed automatically [2].

The concept behind this paper mainly distinguishes from the traditional methods that it mainly aims to reduce the production cost, so the product is deployed with the budget at low cost, which is typical in developing and underdeveloped world.

II. LITERATURE SURVEY

Lifeng Zhou(2019) *In [1] it describes Active* Target tracking communications using multi robot Teams. The proposed theory solves the target tracking problem by using a sensor and the robot is allowed to move around the environment boundary. The measurement of distances to the target is done by the robots. Target tracking problems are solved in various fields; it has huge applications Such as wildlife monitoring and surveillance. The proposed algorithm reduces the working of robots all the time and communicates only during the motion via handgestures.

Hardik s jain(2019) *In [2] it describes the* speed control of dc motor with the IR sensor and PID controller. The existing method has shortcoming of response lag and low accuracy. Various comparisons are carried out between the different

methods of dc motors. The proposed algorithm has Proportional Integral Differential (PID) which is used in controlling the DC motor speed thereby bringing to the desired level. Additionally Infrared sensor (IR) is used to measure the rotation of the motor. The rotation is measured by RPM. It is used in many industrial machines.

Dr.Mohamood Molesh (2019) *In [3] it* describes a Designing and Implementation of Wireless Sensor Based on the MATLAB Interfaced with the Arduino. In Recent years Wireless Sensor (WSN) has had great influence in huge applications. One of the major uses in every aspect is monitoring the environment. It is a great technical improvement in recent years. The proposed algorithm has a facility of interfacing the MATLAB with the Arduino to implement the flexible network. The proposed algorithm uses ZigBee protocol to collect the data of each sensor via wireless manner. It has high flexibility so it can be used through the Routers.

III. EXISTING SYSTEM

In the existing system we have Real time monitoring for detection of mine manually. Manual monitoring of mine can leads to death. The EMI (Electromotive induction) technology is used in this method [10].

DRAWBACKS:

It can cause death if detector is manually used by the human in defense field. And results in high risk factor. The time is consumed more by using existing technology. And it also requires man power for working this existing model.

IV. PROPOSED SYSTEM

In the existing system we have Real time monitoring for detection of mine manually. Manual monitoring of mine can leads to death[4]. To mitigate the drawback in the existing system we proposed a new method. This proposed algorithm used to overcome this disadvantage in existing method.

In the proposed system, we control the robot using

hand gesture which also gives audio guidance help to find land mine easily in order to avoid death. Hand gesture is used to detect the mines at any location [5]. Our proposed methodology describes the detection of metal using a robotic vehicle controlled using hand gesture by RF signal wirelessly.

This paper projects the cause and effects of landmines in defence fields.. A H-bridge module ,a special wheel is equiped which allows the robot to control in all possible directions.In this paper we are focusing on the safety of humans.

A special range of sensor is equiped to dectect the obstacles. For project fabrication, a light weight temperature resistant metal is made to carry all objects.Commands were given to the robot by a microcontroller.

This technique provide benefits to reduce human casualities, the robot can be controlled and objects are detected efficiently after implementation [9].

ADVANTAGE

In the proposed system, we control the robot using hand gesture which also gives audio guidance help to find land mine easily which avoid of death. It is used to detect the mines at any location with hand gesture[6]. Less man power require. High accuracy

v. SYSTEM ARCHITECTURE

In this system, we use the ARDUINO UNO microcontroller which acts as the brain of the system, because the entire system program instruction is stored in it. Here in this system we have two sections in which one acts as transmitter from where the instruction is sent to control the robot and the other one acts as receiver which here as robot .

The transmitter section consist of flex sensor which we use here to control the movements of the robot and at the same time it gives audio guidance and transmit to the receiving section using radio frequency based device called NRF24L01.The receiving section consist of ultrasonic sensor, metal detector to detect any obstacle on the path of the robot and detection metal substance like mine respectively. Motor driver, Gear motor and robotic chases are used here for the movement of the robot, all the operation of the system is displayed on the LCD display.

BLOCK DIAGRAM TRANSMITTER BLOCK

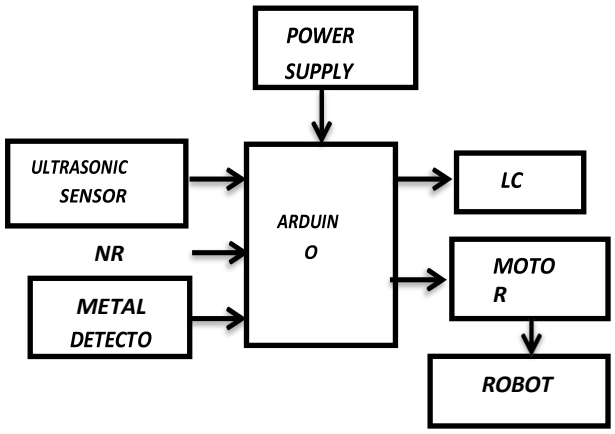

Fig 1- Transmitter block

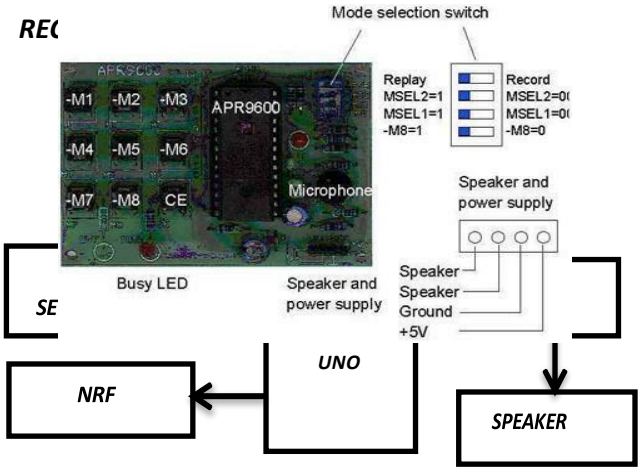

Fig 2- Receiver block

VII. TECHNOLOGY USED

Fig.3. APR module.

In this paper, the command for the instruction is stored in APR module, when the operation is performed the APR mode send the data to the speaker.

A. APR9600 MODULE

The module consists of an APR9600 chip, a mode selection switch (-RE, MSEL1, MSEL2 and – M8), electret microphone, 9 keys (-M1 to –M8 and CE) along with its supportive components. The total recording period is 60 seconds with a sampling rate of 4.2 kHz provided by an oscillation resistor [6]. The value of the ROSC can be changed by the user to obtain other sampling frequencies.

B.FLEX SENSOR

The flex sensor is used for identification of direction and this technology works with the help of resistive carbon elements. The presence of variable printed resistor shows a great reflection in the form-factor on the thin flexible substrate[8].

The sensor produces high out resistance value which has been correlated the bend radius provided if the substrate has a bent structure. In this paper, flex sensor is used based upon the bend resistance the command is sent to receiver. This resistance may vary that should be checked for better performance[7].

Fig.4.Flex sensor.

C.METAL DETECTOR

It is a device used to identify the presence of metal without touching the object. This project explains the purpose of metal detectors. The metal detector works on the principle of inductive sensors [8]. The basic concept used here to identify the presence of metal can vary the inductance value of an inductor. The device discussed here is the modified version of an inductance metre, which has the ability of sensing and changing the direction which in turn triggers an output.

Fig.5.M

etaldetector ***AURDUINO***

UNO

Arduino UNO is the heart of system which is connected to all the sensor and hardware components which is required to achieve the targeted work. The features of the Arduino are small and completely breadboard friendly based on ATmega328.The Arduino controls all the components and achieves the desired work. ATmega 368 has 32 KB of flash memory for storing code in which 2 KB is used for or bootloader. The ATmega 368 has 2kb of SRAM and 1kb of EEPROM. It is very low cost and easily available controller. Every programming is written in an Arduino integrated development environment (IDE).

Arduino IDE is used to run the program easily and it is open source software to write code and upload it to the arduino board. The program runs on the Linux, OS X, windows and Mac OS X.

Fig.6.Aurdui

no UNO ***E.ARDUINO IDE***

SOFTWARE

INTEGRATED DEVELOPMENT ENVIRONMENT

(IDE). It is used to run the program with the tools required by the programmers to develop the software. The element found in the IDE has a source code editor compiler builder and debugger. Programmers use this software because it is easy to use with the simple code convenience they provide while writing code. Examples for this are visual studio express, NetBeans, and ellipse. Every software has unique features and benefits including drawbacks. It has specific language support. It can vary on different software development; they are mobile, web and desktop.

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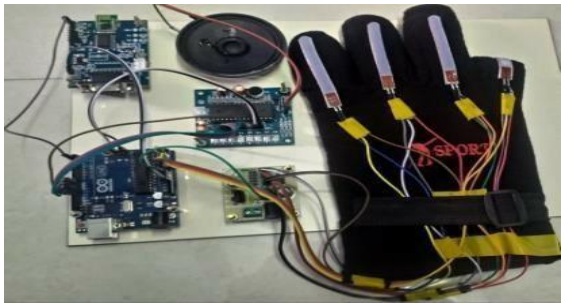
VIII. RESULT



IX. CONCLUSION

We have successfully designed and developed a robotic module which is used in metal detection so that the robot instead of human beings can be employed to detect any dangerous item thereby reducing the chance of human casualties to a great extent. Our prototype is developed with the readily available electronic components which made the design inexpensive and efficient in controlling from a safe distance wirelessly. Further improvement of the design can make it an excellent choice for deployment and also use in peculiar zones.

FUTURE SCOPE

The paper shows a better performance by fixing cameras using raspberry pi for monitoring military surveillance and archeological purposes. Increasing the wireless communication of controlling the robotic vehicle. The system can be further modified by using user interfaces such as android app and providing location. Improving water and weather resistant framework.

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Conducted on
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TITLE
DESIGN OF FULL ADDER USING DUAL-RAIL DOMINO LOGIC

AUTHOERS

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ABSTRACT:

This mini project comprises the Performance analysis of different types of Primitive Gates comparing with Full adder and its characteristics. Adder is used to do an arithmetic operation, like addition, multiplication, accumulation etc., Likewise, there is N number of adders are available with specific characteristics. Based on these adders are divided into three categories comparing to other adder, Full Adder gives a best performance in slicing, area consumption and delay. This can shows a best result in simulation by occurs moderate power consumption and less delay of designing high speed applications, In upcoming sessions we are going to discuss about the different types of Primitive Gates and my new proposal along with simulation results of all Primitive Gates and Full Adder Circuit by Dual-Rail Domino Logic.

DESIGN OF FULL ADDER USING DUAL-RAIL DOMINO LOGIC

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INTRODUCTION:

Domino logic can only implement monotonic functions, and many important logic functions, such as almost all arithmetic functions, are non-monotonic. In fact, non-monotonic functions can be implemented using domino logic by simply computing both polarities of each signal. Such circuits are called dual-rail because each logical variable is represented by two wires, one that goes high if the signal is true and one that goes high if the signal is false, with this encoding, an input variable going true can cause an output variable to go true or false (non-monotonic behaviour), and yet all signals are montonically rising. Such dualrail domino circuits represent one of the fastest ways to implement a given logic function and thus are widely used today in the arithmetic units of the fastest microprocessors.

FULL ADDER:

Due to rapid growth in digital world such as mobile phones, computers, laptops etc. which need to have low power consumption, high performance with less amount of delay[3]. Full adder is core block for the circuits which performs arithmetic operations (addition, subtraction, multiplication & division). Hence the system's performance is based on the performance of the full adder [4]. So realizing full adder with the parameters such as low power and with high speed performance is important. Thus increasing the performance of the full adder will increase the system's performance [5].

$$SUM = \overline{C} \bullet A \oplus B + C \bullet \overline{A \oplus B}$$
$$CARRY = \overline{A \oplus B} \bullet B + A \oplus B \bullet C$$

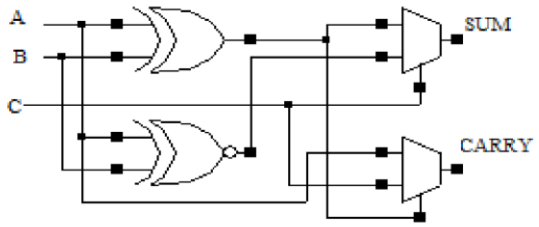


fig 1 FULL ADDER

In above fig 1 shows gate level representation of Full adder, which is consist of XOR gate, XNOR gate and two multiplexers which gives the output (i.e.) (sum, carry)

Usually XNOR and XOR gates are used to design full adders [6]. But XOR and XNOR gates consumes more power. By reducing the power consumption of the XOR and XNOR gate we can reduce the power consumption of full adder.

The major constrain for most of the systems is power consumption [7]. In low voltage or low power applications, the optimization of speed and power is the biggest issue. These issues can be tackled by using GDI (gate diffusion input) technique. Hence the power and speed issue can be overcome by designing full adder using GDI (gate diffusion input) technique.

The major operation of all devices is arithmetic operation (addition, subtraction, multiplication and division). Full adder is most widely used for arithmetic operations [8].E.g.) computers, laptops, smart watches, mobile phones etc.

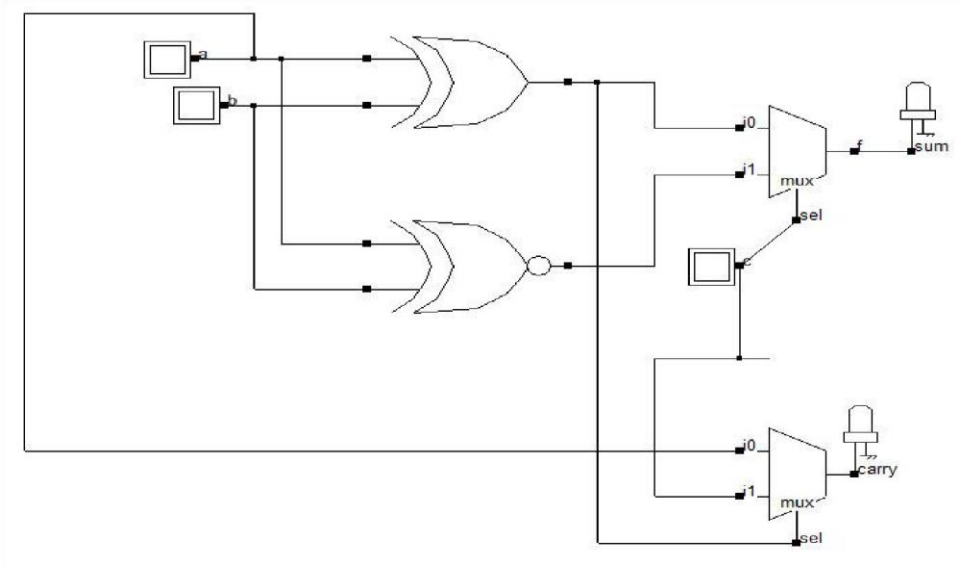
DESIGN OF FULL ADDER:

The basic circuit which we have taken is shown below we use this circuit to design a full adder by using Dual-Rail Domino realization. We have taken XOR-XNOR-MUX Full adder. Full adder is a logical circuit that performs an addition operation on three binary digits. It contains A,B,C as input and sum, carry as output. The representation of full adder is shown below.

The sum and carry expression is given as

1. **sum=(A⊕B).C'+(A⊕B)' .C**
2. **carry=A.(A⊕B)'+C.(A⊕B)**

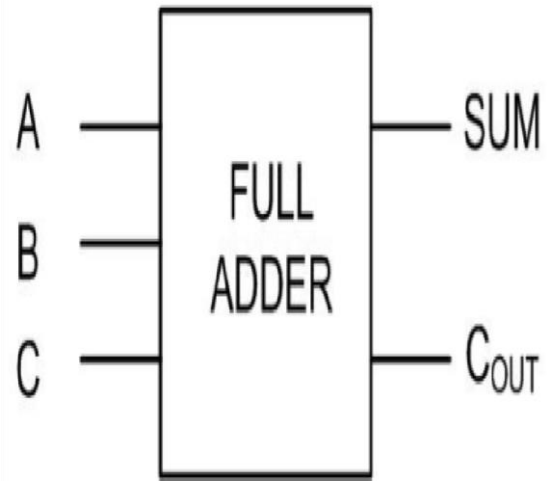
FULL ADDER CIRCUIT:



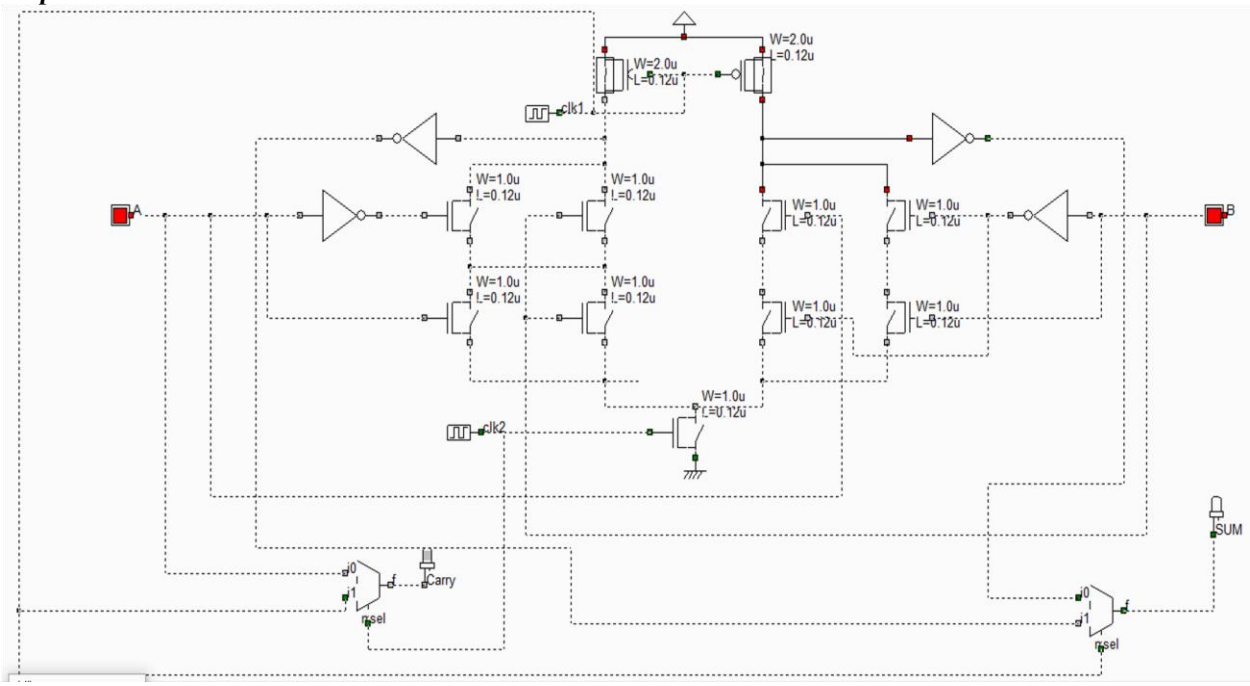
The input is a, b, c and the output is sum and carry. The circuit consists of XOR and XNOR gate with two multiplexers and the output of the multiplexers is taken as sum and carry[9] .

TRUTH TABLE

Input			Output	
A	B	Cin	Sum	Carry
0	0	0	0	0
0	0	1	1	0
0	1	0	1	0
0	1	1	0	1
1	0	0	1	0
1	0	1	0	1
1	1	0	0	1
1	1	1	1	1

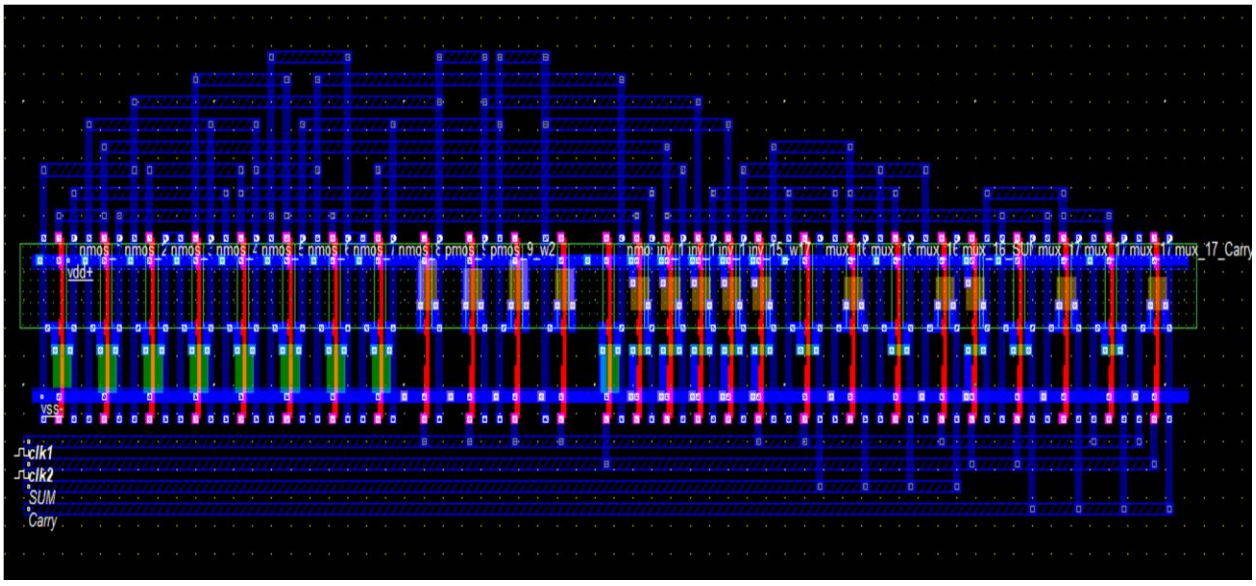


Output1:

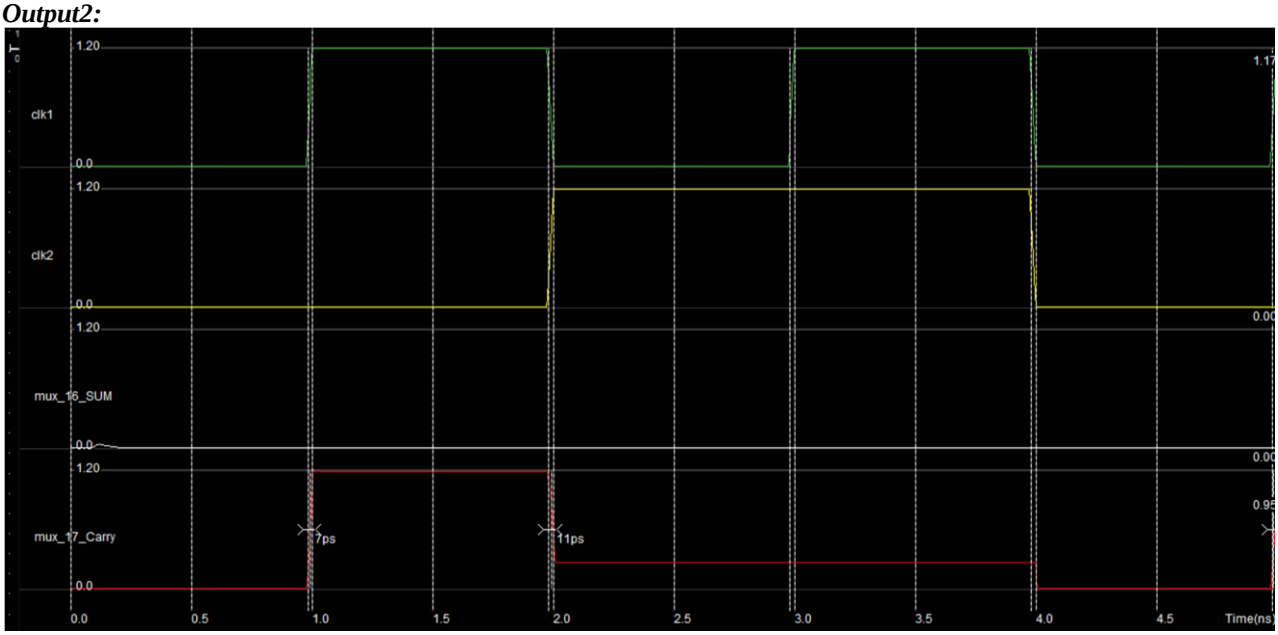


MASK LAYOUT DESIGN:

The physical mask layout of any circuit is manufactured using a particular process to a set of confine geometry; the main objective of design rules is to achieve a high overall yield and reliability.



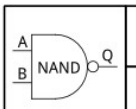
Output2:



SIMULATION OF PRIMITIVE GATES:

IMPLEMENTATION AND/NAND

The *AND gate* is so named because, if 0 is called "false" and 1 is called "true," the gate acts in the same way as the logical "and" operator. The following illustration and table show the circuit symbol and logic combinations for an AND gate. (In the symbol, the input terminals are at left and the output terminal is at right.) The output is "true" when both inputs are "true." Otherwise, the output is "false." In other words, the output is 1 only when both inputs one AND two are 1. The *NAND gate* operates as an AND gate followed by a NOT gate. It acts in the manner of the logical operation "and" followed by negation. The output is "false" if both inputs are "true."



		A	
		0	1
B	0	1	1
	1	1	0

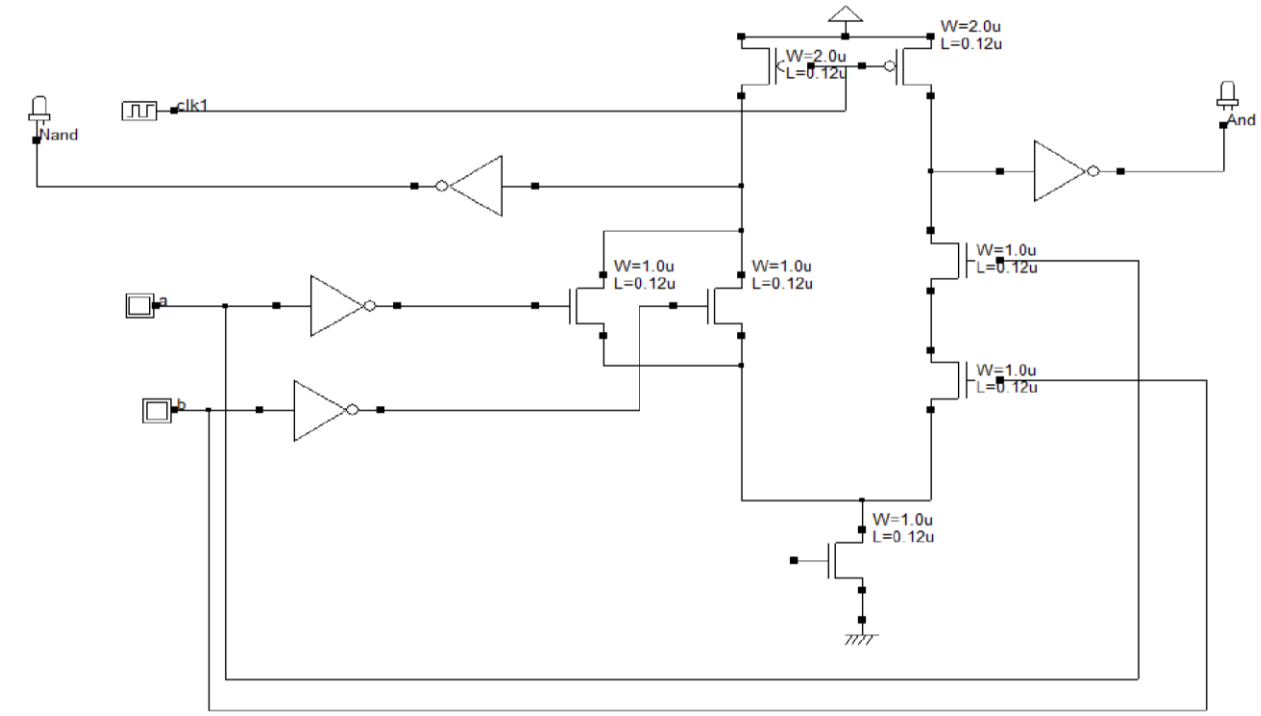
A B AND Q		A	
		0	1
B	0	0	0
	1	0	1

Fig: AND TRUTH TABLE

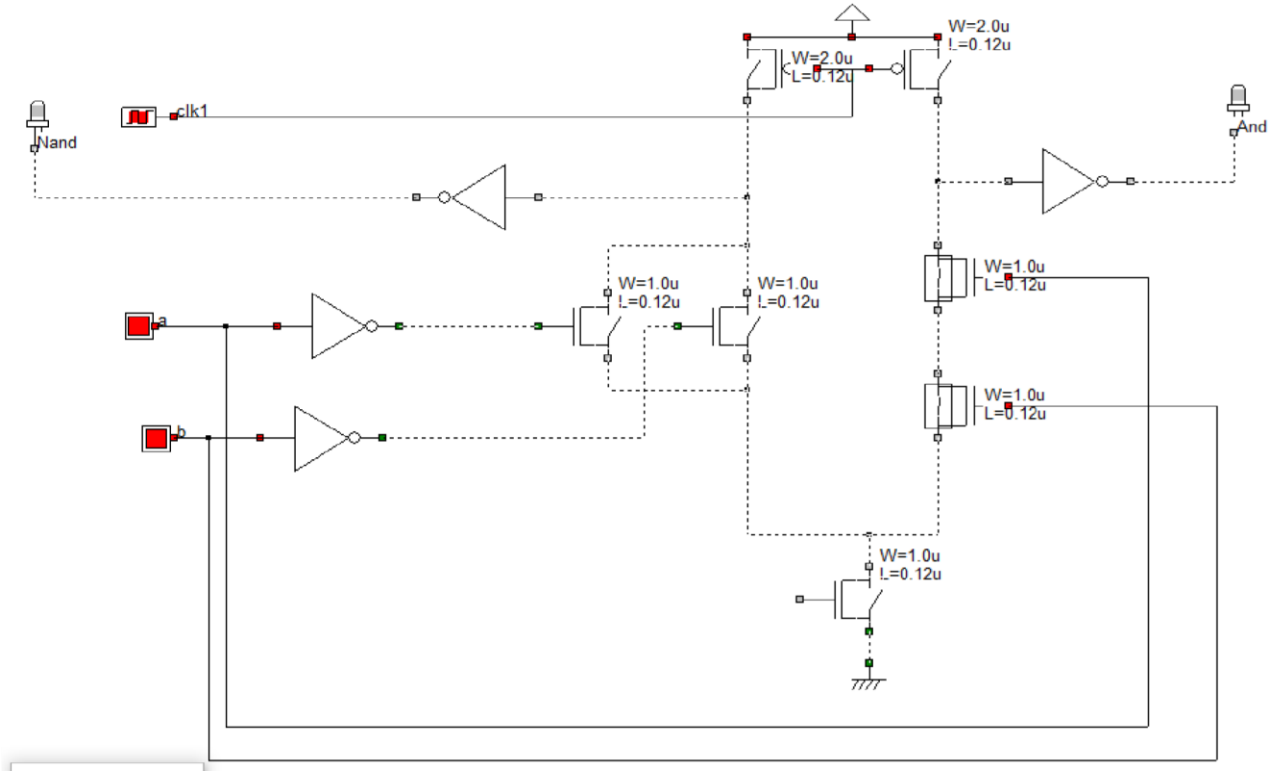
A B NAND Q		A	
		0	1
B	0	1	1
	1	1	0

Fig: NAND TRUTH TABLE

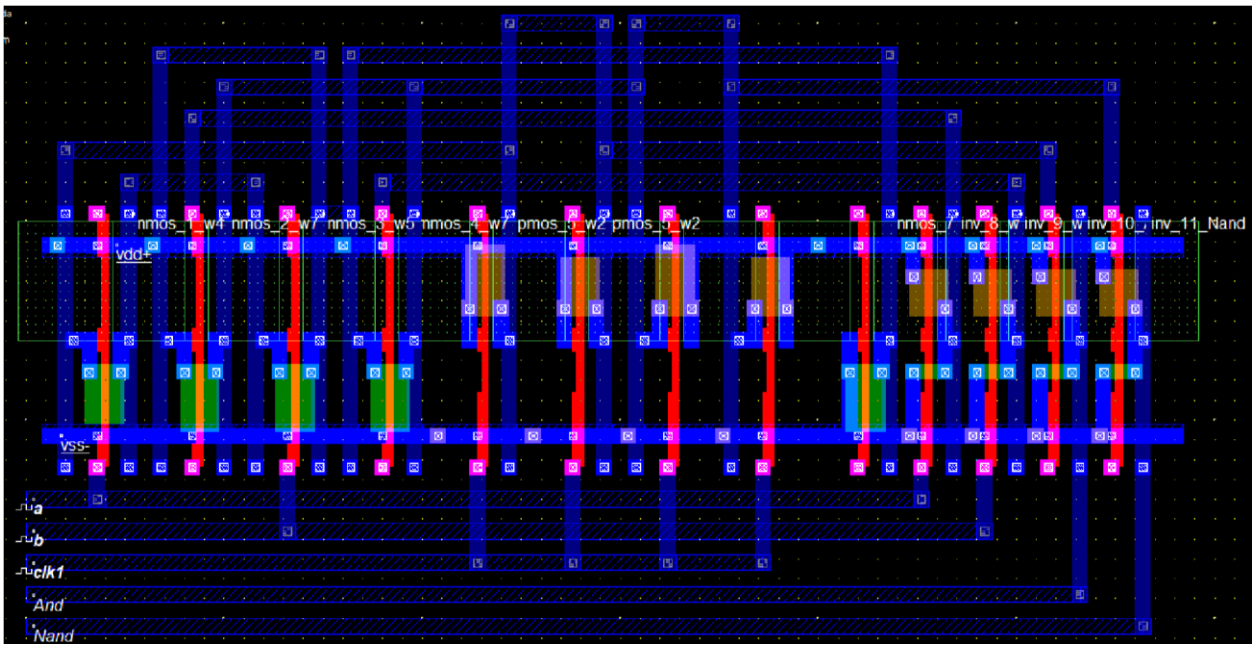
SCHEMATIC DIAGRAM



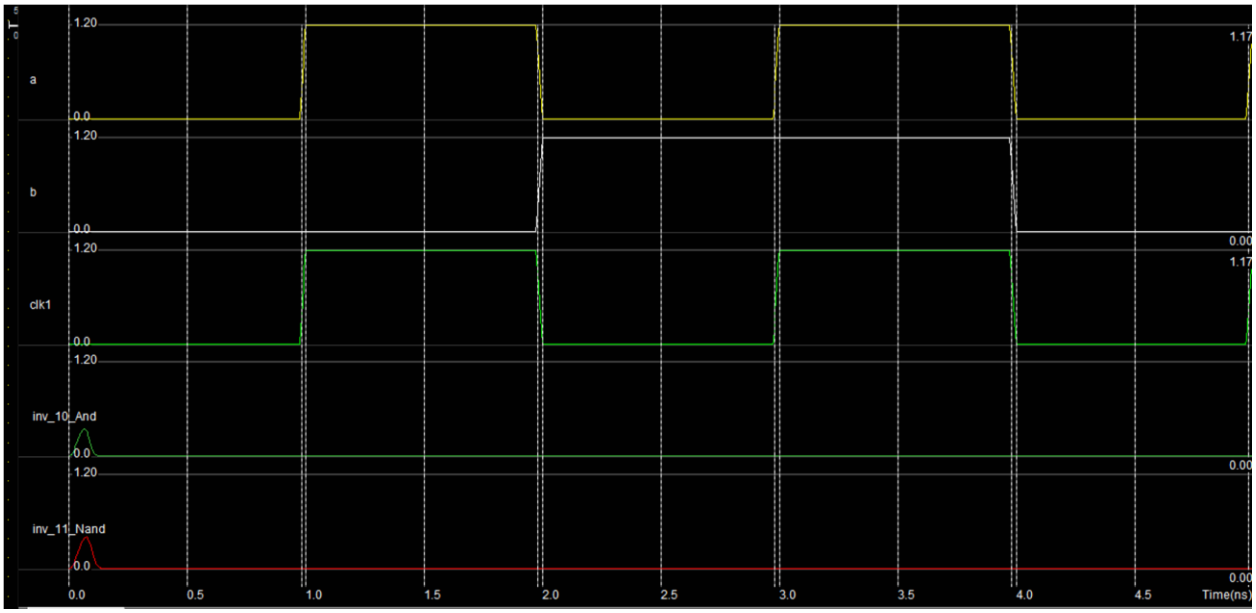
OUTPUT1:



MASK LAYOUT DESIGN:

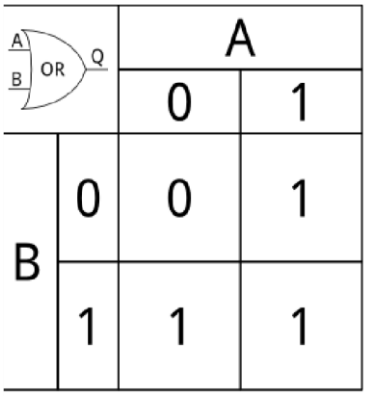


OUTPUT2:



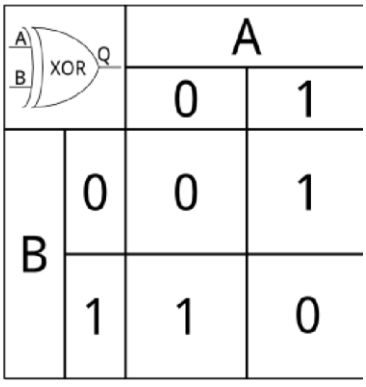
IMPLEMENTATION OR/NOR

The *OR gate* gets its name from the fact that it behaves after the fashion of the logical inclusive "or." The output is "true" if either or both of the inputs are "true." If both inputs are "false," then the output is "false." In other words, for the output to be 1, at least input one OR two must be 1. The *OR gate* gets its name from the fact that it behaves after the fashion of the logical inclusive "or." The output is "true" if either or both of the inputs are "true." If both inputs are "false," then the output is "false." In other words, for the output to be 1, at least input one OR two must be 1.



B \ A	0	1
0	0	1
1	1	1

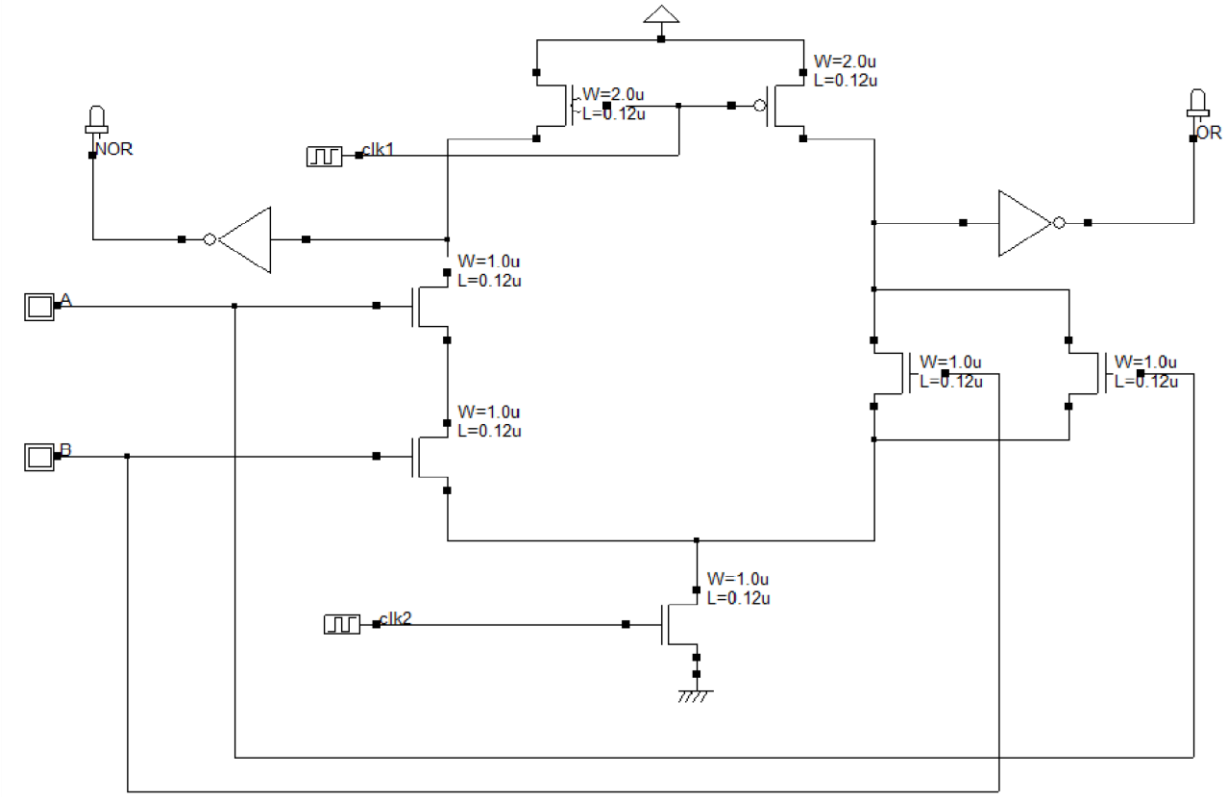
Fig: OR TRUTH TABLE



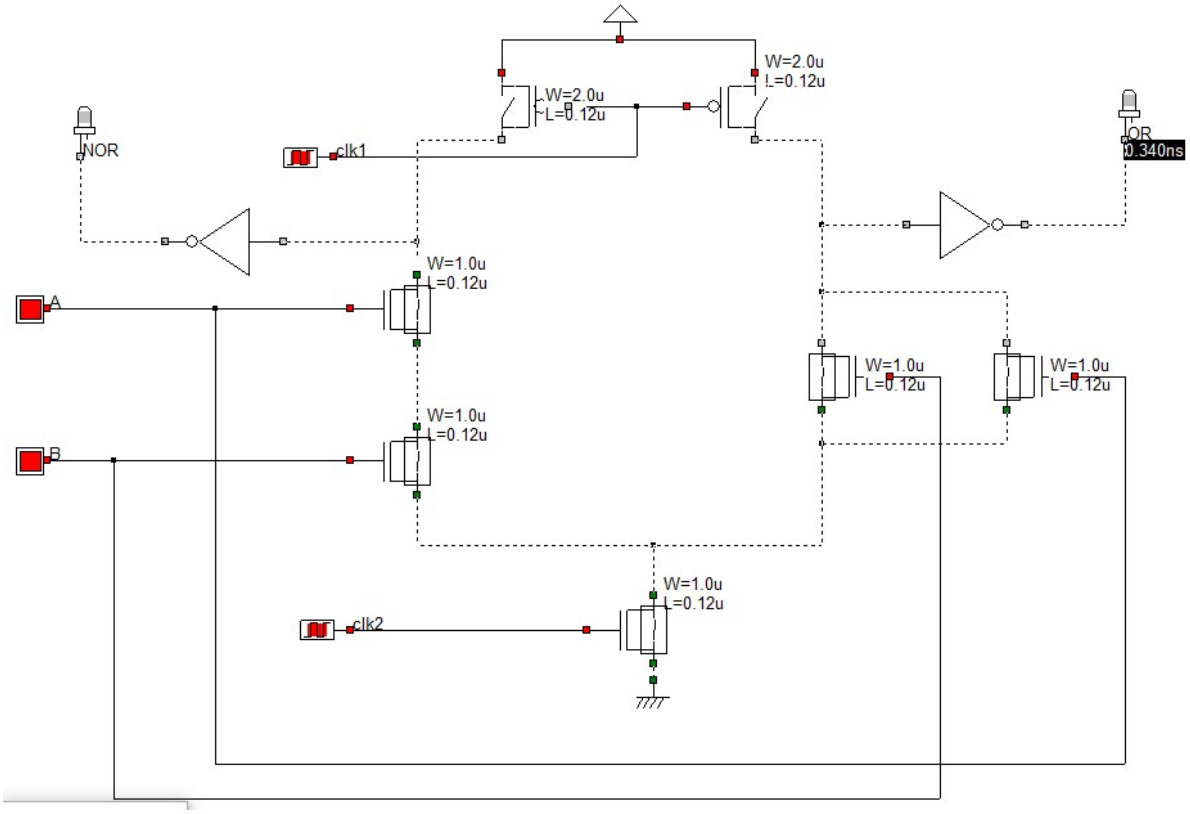
B \ A	0	1
0	0	1
1	1	0

Fig: NOR TRUTH TABLE

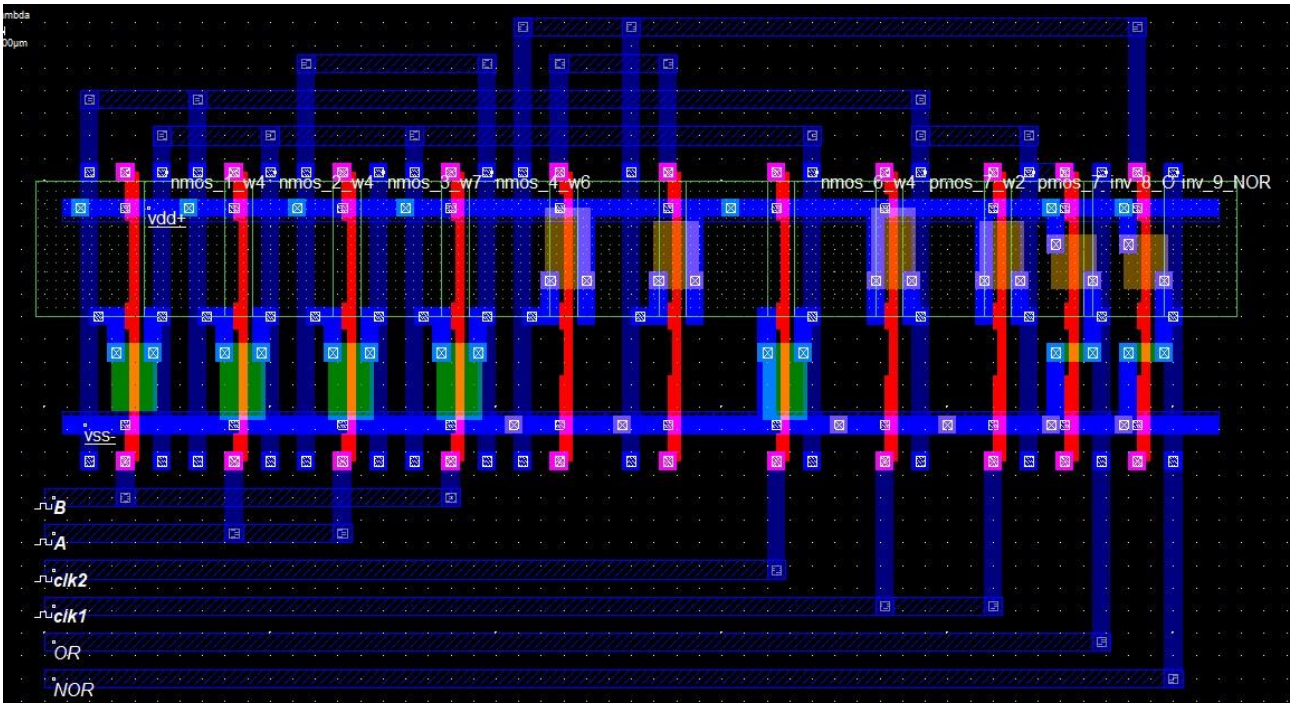
SCHEMATIC DIAGRAM



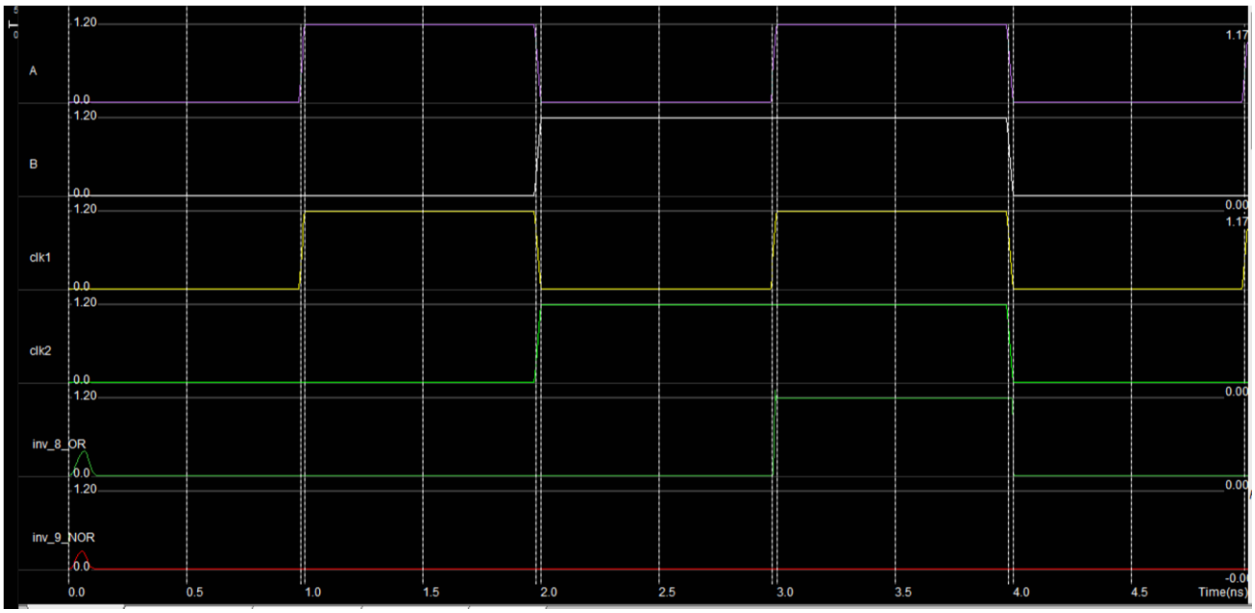
OUTPUT1:



MASK LAYOUT DESIGN:

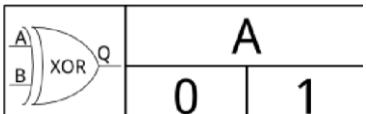


OUTPUT2:



IMPLEMENTATION XOR/XNOR

The *XOR* (*exclusive-OR*) *gate* acts in the same way as the logical "either/or." The output is "true" if either, but not both, of the inputs are "true." The output is "false" if both inputs are "false" or if both inputs are "true." Another way of looking at this circuit is to observe that the output is 1 if the inputs are different, but 0 if the inputs are the same. The *XNOR (exclusiveNOR) gate* is a combination XOR gate followed by an inverter. Its output is "true" if the inputs are the same, and "false" if the inputs are different



		A	
		0	1
B	0	0	1
	1	1	0

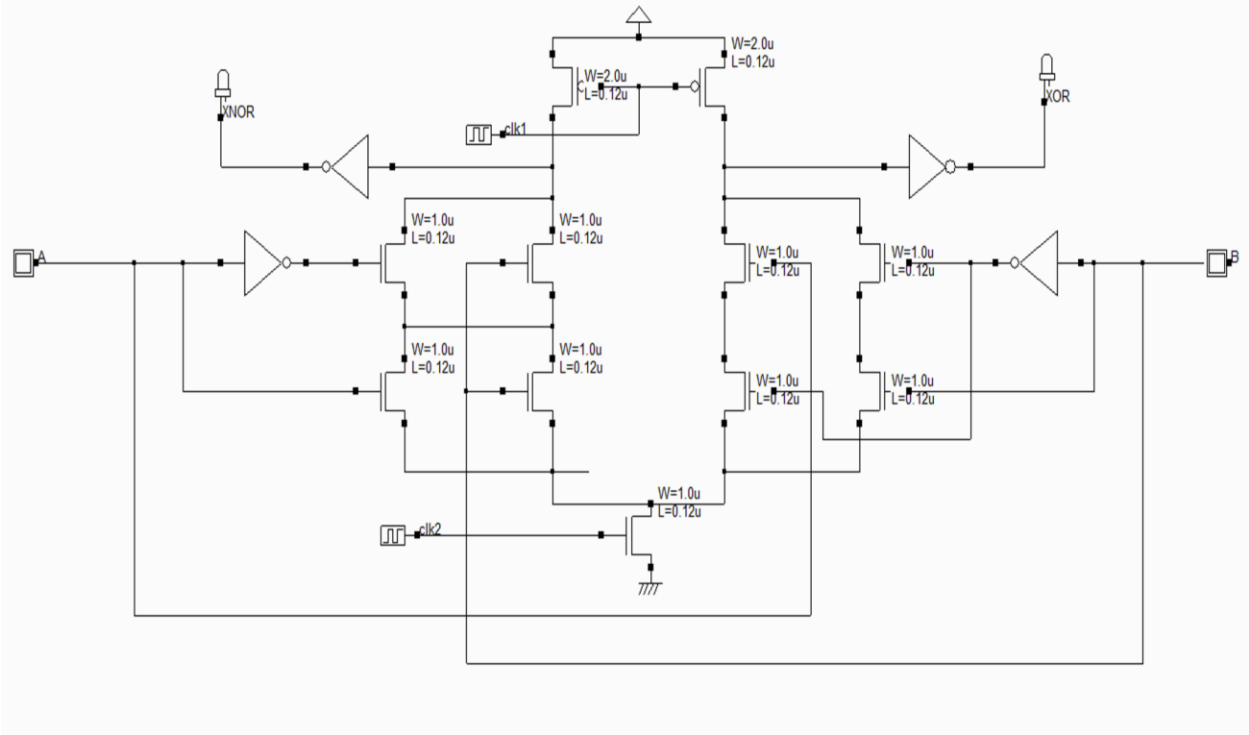
INPUT		OUTPUT
A	B	C
0	0	1
0	1	0
1	0	0
1	1	1

Truth Table

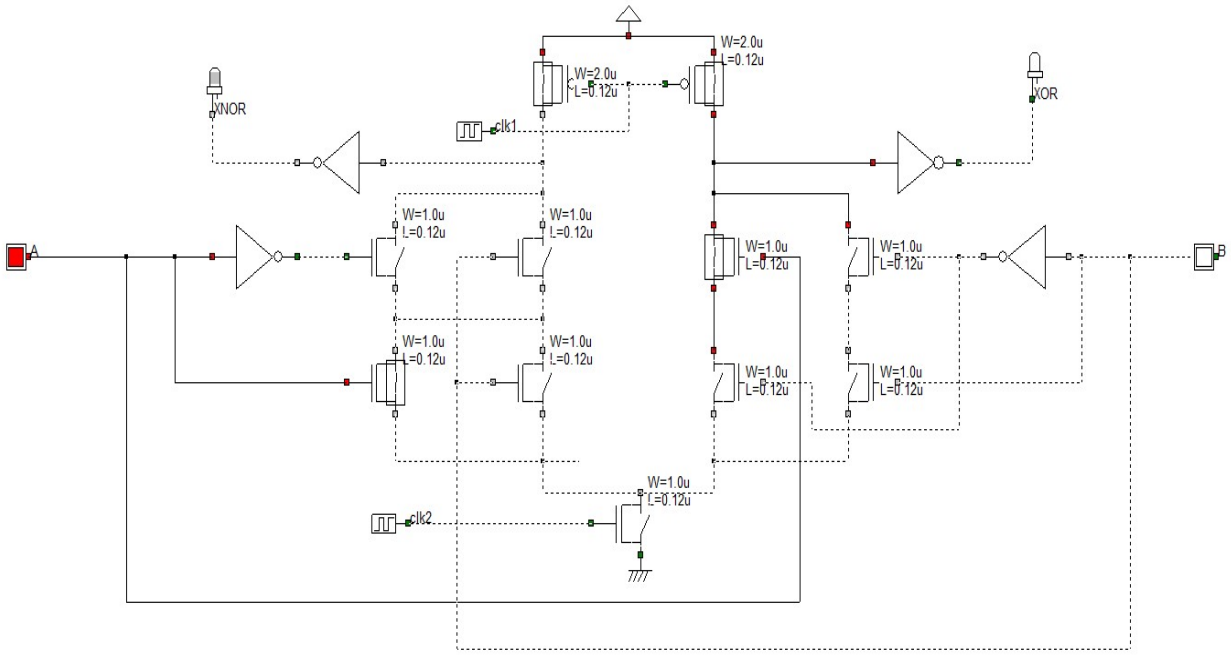
Fig: XOR TRUTH TABLE

Fig: XNOR TRUTH TABLE

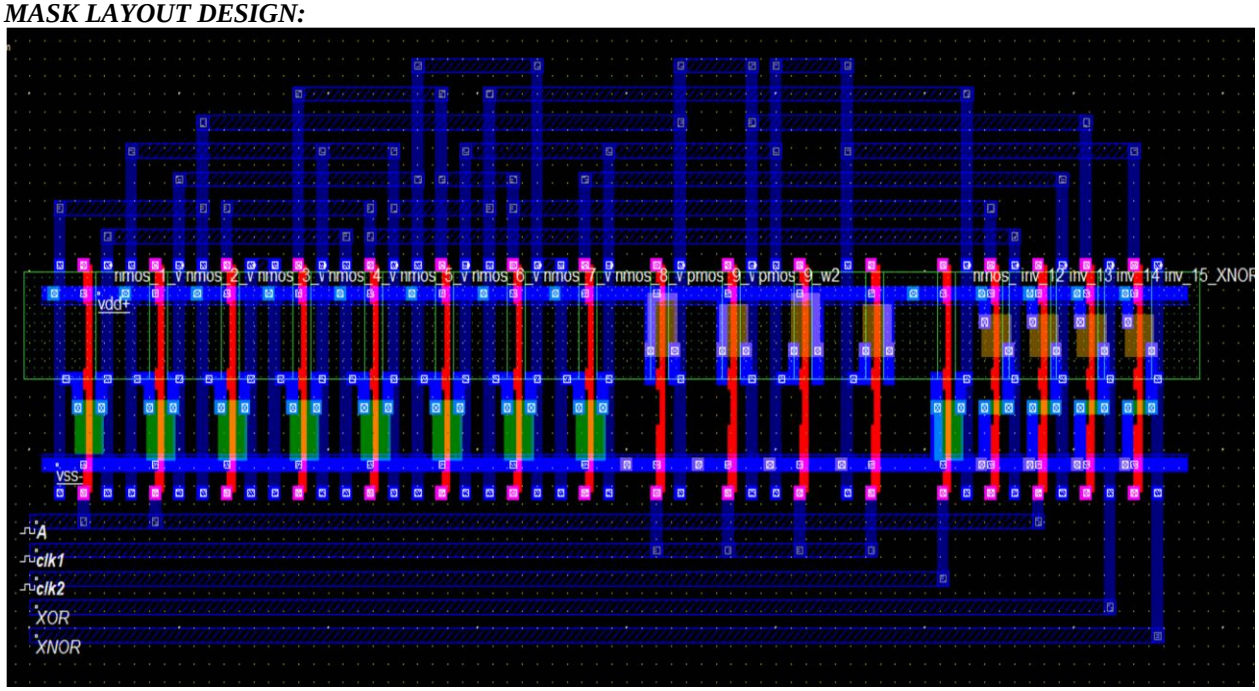
SCHEMATIC DIAGRAM



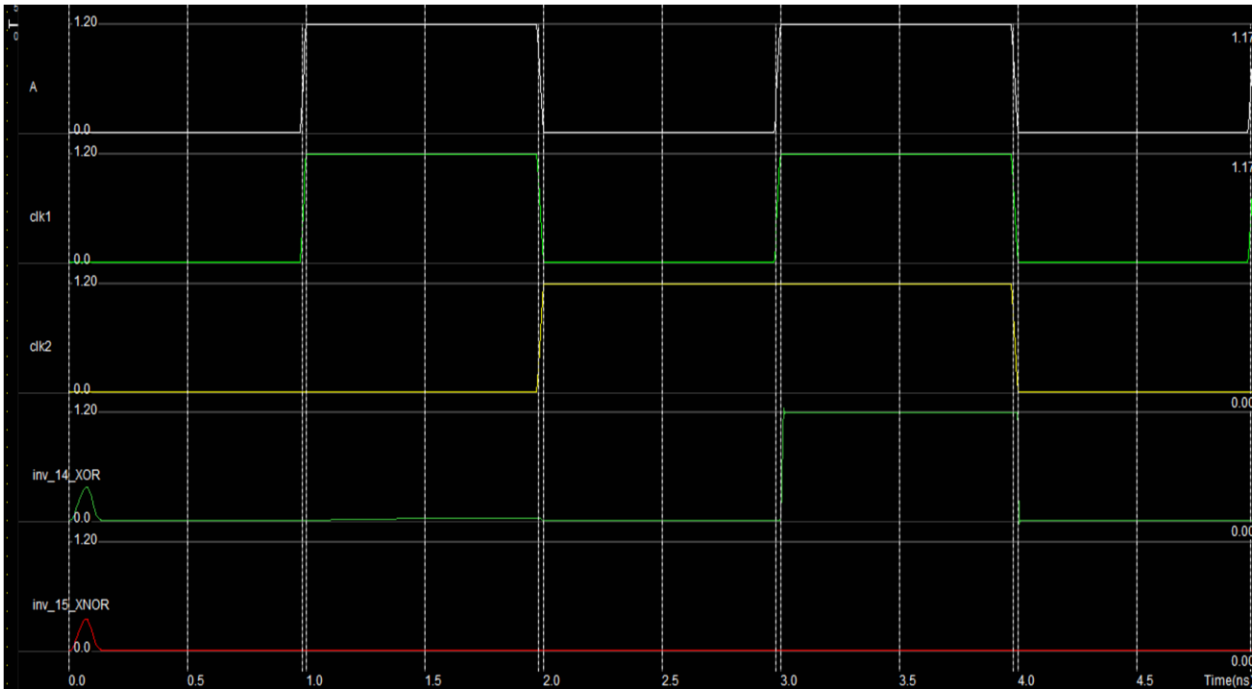
OUTPUT1:



MASK LAYOUT DESIGN:



OUTPUT2:



PERFORMANCE ANALYSIS TABLE:

Gate type	Rise time	Fall time	Total time Period	Power Consumption	Total number of Transistors used in a circuit
AND/NAND	16Ps	16Ps	32Ps	13.56 mW	15
EXOR/EXNOR	0.590ns	0.590ns	1.180ns	14.381 µW	19
OR/NOR	0.340ns	0.340ns	0.680ns	0.169mW	11
EXOR/EXNOR in FULL ADDER	7Ps	11Ps	18Ps	12.181mW	19

CONCLUSION:

In This Mini-Project the characteristics of Primitive Gates like the power consumption, area, delay, Total Number of Transistors in gate circuit has been analysed. Delay is a major drawback for VLSI design hence an optimization of various

circuits.Thus full adder design Using Dual-Rail Domino logic is used in various applications such as digital signal processing, microprocessors and other processor circuits. Thus we conclude that Dual Rail Domino Logic Circuit is the most efficient and optimized method for circuit design..

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PROCEEDING OF
NATIONAL E-CONFERENCRE ON HARDWARESECURITY
Conducted on
25 TH AND 26 TH JUNE 2020

Paper Code
NCHS202003138

TITLE

DYNAMIC VM SCALING:PROVISIONING AND PRICING THROUGH AN ONLINE AUCTION

AUTHOERS
Mrs Suganya,R.Srinivasan

Department of Computer Science and Engineering, Jeppiar Institute Of Technology,Chennai

ABSTRACT:

In this present structure, for the most part cloud providers like amazon, drop box, I-cloud are one of the appropriated stockpiling contraptions. The customers can need to buy the cloud infers they have to buy through on the web. On account of time limitation, the offer will over in a limited ability to focus. Furthermore, they have been gaining back the first venture issue among cloud customers and cloud providers, it will satisfy both or not. To vanquish this issue, here cloud providers introduced the contribution structure. This framework for the most part used in online deal the person who offering their total will be secretively kept up by the chairman What's more, result will be appropriated by cloud provider's data figuratively speaking. This site may need to buy cloud providers in extraordinary manner. It will satisfy both the customers and cloud providers. This structure may remember for the online closeout.

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INTRODUCTION

Ideal allotment of assets on servers to suit timeshifting requests of Efficient clients is at the center of dynamic VM scaling. Essentially, without knowing which VM is to be scaled up and which client will settle on scaling out, it is overwhelming to choose which servers to put the VMs in any case, even to simply give a fairly decent assurance of asset accessibility for future scaling requests. The test heightens when we think about server costs, endeavoring to accomplish high productivity in power utilization and server usage simultaneously. A successful online arrangement is as yet absent, to enhance both client fulfillment and supplier utility, i.e., the social government assistance.

Proficient opportune assignment of assets on servers to suit time-shifting requests of clients is at the center of dynamic VM scaling. For all intents and purposes, without knowing which VM is to be scaled up and client will oor scaling out, it is overwhelming to settle on which servers to put the VMs in any case, even to simply give a to some degree great assurance of asset accessibility for future scaling requests. The test raises when we contemplate server costs, endeavoring to accomplish high productivity in power utilization and server usage simultaneously. A powerful online arrangement is as yet absent, to streamline both client fulfillment and supplier utility, i.e., the social government assistance.all the information are stored in the cloud environment.

OBJECTIVE

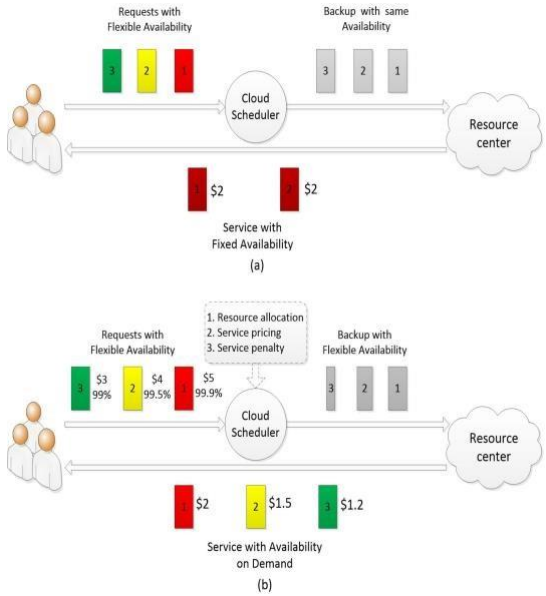
VMs on heterogeneous servers for energy cost minimization on the go. We carefully design resource prices maintained for each type of resource on each server to achieve threshold based online allocation and charging, as well as a novel competitive analysis technique based on sub modularity of the offline objective, to show a good competitive ratio is achieved. It is majorly used for Online Bidding and Product purchasing based on Auction Mechanism in a truthful dynamic manner. However, we can also implement the online shopping web application containing of their Products. Here, all the information about buyers and sellers will be stored in cloud environment

PROJECT DESCRIPTION

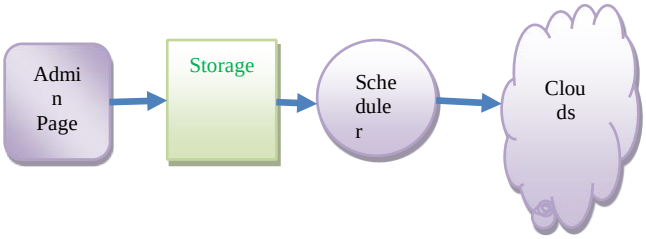
In this undertaking we need to make sure about the document is the primary inspiration. In this, there is two sections are there one is client side and another is administrator side. In client side, just they will transfer the information as document. After that in an administrator side, there are four administrators are there .If the primary client needs the document they needs affirmations of the other three individuals then just they will utilize the record else they are not tolerating the record .The principle thought process is that, if the main client needs the record the other three individuals affirmation is significant then just the requester will utilize the file.There are five modules.

BLOCK DIAGRAM

Secure distributed storage, which is a developing cloud administration, is intended to ensure the privacy of redistributed information yet additionally to give adaptable information access to cloud clients whose information is out of physical control.



QUALITY OF SERVICE



HARDWARE REQUIREMENTS

The hardware requirements may serve as the basis for a contract for the implementation of the system and should therefore be a complete and consistent specification of the whole system. They are used by software engineers as the starting point for the system design. It shows what the system does and not how it should be implemented.

PROCESSOR: PENTIUM IV 2.6 GHz,Intel Core 2 Duo.

RAM	:	4GB DD RAM
MONITOR	:	15” COLOR
HARD DISK	:	40 GB

SOFTWARE REQUIREMENTS

The software requirements document is the specification of the system. It should include both a definition and a specification of requirements. It is a set of what the system should do rather than how it should do it. The software requirements provide a basis for creating the software requirements specification. It is useful in estimating cost, planning team activities, performing tasks and tracking the teams and tracking the team’s progress throughout the development activity.

FrontEnd	: J2EE (JSP, SERVLETS) JAVASCRIPT
Back End	: MY SQL 5.5
Operating System	: Windows 07
IDE	: Eclipse

LITERATURE SURVEY

Finding your Way in the Fog: Towards a Comprehensive Definition of Fog Computing AUTHOR Luis M. Vaquero, Luis Rodero-Merino. YEAR : 2014.

Portrayal: The cloud is moving to the edge of the system, where switches themselves may turn into the virtualisation foundation, in an advancement marked as "the mist". Be that as it may, numerous other integral advances are arriving at a significant level of development. Their transaction may significantly move the data and correspondence innovation scene in the next years, bringing separate advancements into a shared opinion. This paper offers a complete meaning of the mist, fathoming advances as various as cloud, sensor systems, distributed systems, arrange

virtualisation capacities or design the board strategies. We feature the principle challenges looked by this conceivably advancement innovation amalgamation.

TITLE: A taxonomy and survey of grid resource management systems for distributed computing AUTHOR : Klaus Krauter1,*,Ť, Rajkumar Buyya2 and Muthucumaru Maheswaranl. YEAR : 2002. Portrayal:The asset the executives framework is the focal segment of dispersed system registering frameworks. There have been numerous tasks centered around arrange registering that have planned and executed asset the board frameworks with an assortment of models and administrations. In this paper, a theoretical model and an extensive scientific categorization for portraying asset the executives structures is created. The scientific classification is utilized to distinguish approaches followed in the execution of existing asset the executives frameworks for exceptionally enormous scope organize registering frameworks known as Grids. The scientific categorization and the review results are utilized to distinguish design approaches and issues that have not been completely investigated in the examination.

DYNAMIC WORKFLOW SCHEDULING

This is the last module in our venture; in this module here we will distribute the assets for clients which are prepared after sale based booking process. Here, we are actualizing the make spam and checking cost of the procedure which includes in unique procedure. By utilizing the procedure profile of the client procedure we will apportion the rank dependent on the undertakings which are performed by the client. Here, we will likewise presenting a period based planning process which will include switch sell off component to offer the client for his decisions relies on proposed time and proposed cost of the bartering procedure. After, the culmination of closeout process they will gives us the subtleties of champ in that sale procedure which has been planned progressively

DESIGN ENGINEERING

Configuration Engineering manages the different UML (Unified Modeling language) charts for the usage of undertaking. Configuration is an important building portrayal of a thing that will be assembled.

Programming configuration is a procedure through which the prerequisites are converted into portrayal of the product. Configuration is where quality is rendered in programming building. Configuration is the way to precisely make an interpretation of client prerequisites into wrapped up item.

MODULE DESCRIPTION:

USER INTERFACE DESIGN

This is the principal module of our undertaking. The significant job for the client is to move login window to client window. This module has made for the security reason. In this login page we need to enter login client id and secret phrase.

It will check username and secret word is coordinate or not (legitimate client id and substantial secret word). On the off chance that we enter any invalid username or secret word we can't go into login window to client window it will shows mistake message. So we are keeping from unapproved client going into the login window to client window. It will give a decent security to our task. So server contain client id and secret phrase server likewise check the verification of the client. It well improves the security and keeping from unapproved client goes into the system. In our venture we are utilizing JSP for making plan. Here we approve the login client and server confirmation.

QUALITY OF SERVICE

In this module, the information is given by client demands show up at each front-end intermediary server. After the accepting the information it sense naturally to check the whether the server the absolute number of Server. What's more, it dependent on progressively produced DNS reactions, HTTP redirections, or utilizing relentless HTTP intermediaries to burrow demands. We accept that there exists an intermediary/DNS server assembled with each solicitation source.

against a database, and rewarded in an intelligible and solid route autonomous of different exchanges. An exchange for the most part speaks to any adjustment in database client will move the sum to supplier.

possible that one -round just, or

PRICE MATCHING

AUCTION-BASED SCHEDULING

This is the third module in our undertaking, here the closeout based planning procedure will occur while during the client when a few sale have been proposed for appropriated frameworks. They displayed load adjusting as an obliged minimization issue and introduced a calculation that limits the normal fulfillment time of assignments. The proposed offering calculation is portrayed dependent on nearsighted harmony techniques. They investigate levelheaded techniques of clients in a rehashed sell off based system in which clients search for required assets by refreshing their offers. The effect of withdrawn specialists to deliver misfortunes on different operators taking part in an assignment booking component on related machines.

USER TRANSACTION

This is the fourth module in our undertaking, here represents a unit of work performed inside a database the board framework (or comparative framework) rearrange VMs into type-careless great (and henceforth bypass the test forced by combinatorial sell-offs)

This is the fourth module in our task, the current cloud suppliers typically charge clients dependent on apay-as-you-go valuing model. As for our multiprovider cloud model and the two thought about targets (make length and fiscal cost), CSPoffers is the asset unit value, thus AIneeds to get complete soliciting cost from a CSP to the CSCdemanded administration and match it with the CSC's offering cost to locate the qualified exchange relationship among CSCs and CSPs. For VMS,

CPS, DBS, and STS, the absolute ask

FUTURE ENHANCEMENT

Future work presents the primary online systems are it is

combinatorial closeout for the VM showcase in distributed computing. It propels the cutting edge of cloud closeout plan in that all past VM sell off

CONCLUSION

This work structures an honest and effective online closeout for dynamic asset scaling and evaluating, where cloud clients more than once of into the future with expanded sums, as indicated by their scale-up/out inclinations. We consider server vitality cost minimization in social government assistance amplification, and uncover a significant property, sub measured quality, of the target work in the subsequent

essentially all the more testing disconnected issue

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PROCEEDING OF
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Paper Code
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TITLE
Receiver Diversity Combining Using Evolutionary Algorithms in Rayleigh Fading Channel

AUTHOERS
Reena Gladius K
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Jeppiaar Institute Of Technology

ABSTRACT:
In decent variety joining at the recipient, the yield signal-to-commotion proportion (SNR) is regularly augmented by utilizing the maximal proportion consolidating (MRC) given that the channel is consummately evaluated at the beneficiary. Nonetheless, channel estimation is once in a while immaculate inpractice,which results in deterio rating the system performance.In this paper,an imperialistic competitive algorithm(ICA)is proposed and contrasted and two other developmental based calculations, specifically, molecule swarm streamlining (PSO) and hereditary calculation (GA), for assorted variety joining of signs traversing the flawed channels. The proposed calculation modifies the combiner weights of the received signal components in such a way that maximizes the SNR and minimizes the bit error rate(BER). The outcomes demonstrate that the proposed technique wipes out the need of channel estimation and can beat the traditional diversity combining methods

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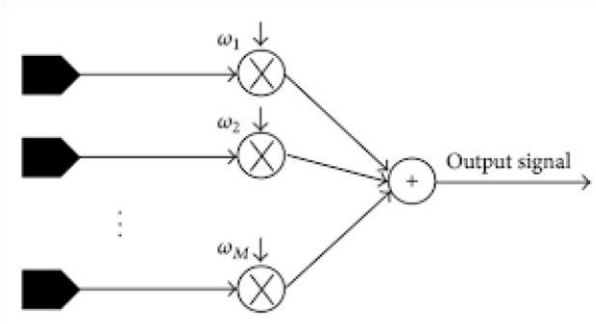
I.Introduction

Decent variety procedures are among the noticeable approaches to improve the dependability of remote correspondence frameworks [1, 2]. These methods, which on a very basic level add up to transmitting signals over autonomous blurring channels, are utilized truly to battle against blurring. The primary thought of assorted variety is to extricate data from the got signal parts transmitted over numerous blurring channels to improve the got signal-to-commotion proportion (SNR) [3, 4]. The enormous enough dividing is basic so as to ensure that the got signals are free, which is an essential requisite to acquire the full benefit of the diversity receiver[5]. Clearly there would be a little likelihood that all the got adaptations of sign are in a profound blur. In this way, the set technique assume independent fading effect sover the different signal paths.Out of the three mechanisms, namely, way misfortune, huge scope, and little scope blurring, the initial two are some way or another comparative and can be relieved by the influence command over a significant stretch of time. Assorted variety systems are particularly intended to overcome the small scale fading. In the past decades, different kinds of diversity receivers working over an assortment of blurring channels have been thoroughly evaluated in the writing [5]. The generally utilized decent variety systems incorporate maximal proportion consolidating (MRC),equal gain combining(EGC), and selection combining (SC) [6, 7]. The point of

these strategies is to locate a set of weights $\omega = [\omega 1, \omega 2, ..., \omega M]$as shown in Figure1,which optimize aspect if objective function.Here,the weights are chose to limit the impact of blurring on the got multiple signal components for each individual user.

In MRC, the received signals are weighted accordingly so that the SNR at the output of the combine risthe sum of the average SNR of each branch.In EGC, on the other hand, the received signals are weighted equally and the n added.In SC, the branch with the highest SNR is selected.In allcases, we consider that the receiver has the necessary information of channe lf ading. The exhibition of these strategies has been widely examined in the literature for Rayleigh fading.If the channel is perfectly estimated at the receiver,MRC can be applied to boost the yield SNR and limit the bit mistake rate (BER) [8]. Nonetheless, since the channel estimation is regularly defective practically speaking, the estimation blunder will rot the system performance.While this problem has long been investigated [9, 10], the ongoing developments in versatile correspondence frame works have re established the consideration in appreciating and mitigating the effect to fim perfect channel estimation on decent variety strategies [11]. The blunder execution of MRC in Rayleigh blurring condition with free and indistinguishably dispersed (i.i.d.) assorted variety branches is examined in [12]. In [13], the SNR dissemination is given for comparable

scenarios.In[14],theerrorperformanceofMRCwithi ndependent yet not indistinguishably appropriated (i.n.d.) branches is studied In[15,16], acomparison of hybrid SC/MRC scheme with SC and MRC schemes over Rayleigh fading channels in two situations of level and exponentially rotting multipath force profile (MIP) has been finished.



II System Model

In this paper ,it is assumed that the information bits are modulated by binary phase-shift keying(BPSK) modulation. The channel is thought to be frequency non selective and gradually blurring over the length of the transmitted image. We likewise assume that M diversity branchesare employed at the receiver for reception.In addition, this research work assumes that the assorted variety branches are adequately far separated from one another, so that the received signals are statistically independent with unimportant relationship. This is a fundamental imperative to gain the full advantage of the diversity receiver[5].The received signal at the ith branch is given by

$$r\,i(t) = g\,i\,S\,(t) + n\,i \quad , i = 1, 2, \ldots, M,$$

where$S(t)$is the unit-power transmitted signal and gi signifies the intricate channel gain with uncorrelated and Gaussian disseminated genuine and fanciful parts, each with zero mean and fluctuation $\sigma 2\ gi$. The commotion irregular variable ni is mind boggling additive white Gaussian noise(AWGN) with zero mean and change $\sigma 2\ n = N\ 0/2$. The channel gaingi at two distinctive decent variety branches is thought to be in distinguishably appropriated. It is also assumed that gi and ni are uncorrelated.The signal power over one symbol period Ts,at ith path.

Since we are expecting moderate blurring, the term $|gi|2$ stays consistent over an image period and can be removed from the fundamental. $S(t)$ is accepted to have unit power. Therefore, the instantaneous SNR at the ith path.

Since we are thinking about Rayleigh blurring, $gi = |g\,i\,|ej\angle gi$ where $\angle gi$ is consistently dispersed over [2π, 0] and gi has a Rayleighpdf.Therefore, $|gi|$ and consequently γi have exponential pdf.

$P\,0$ is the measurable normal of $|gi|2$ and Γ speaks to the normal SNR at every individual branch, which fills in as a basic parameter to improve the SNR at the receiver.

The bit mistake rate (BER) in a BPSK framework, given a SNR of γi, is recognized by erfc√2γi, where erfc(x) = (2/√ π) ∫ ∞ $x\ e–t\ 2\ dt$ [12].

Therefore, the BER averaged over the

Rayleigh fading in is given by

$$BER = 1/2(1 - \sqrt{\Gamma 1+\Gamma}).$$

The physical model accept the blurring to be free from one branch to the next.Each branch, therefore,acts as an autonomous example of the arbitrary blurring process (here, Rayleigh). It implies each branch gets an autonomous duplicate of the transmitted sign. Our objective here is to join these free examples in a manner to accomplish the ideal goal of increasing the SNR and reducing the BER.

III.Conventional Weighting Schemes

Right now, joining plans, for example, choice consolidating (SC), equivalent addition consolidating (EGC) and maximal ratio combining(MRC) are investigated.

3.1 Determination Combining:

In determination consolidating (SC), the branch with the greatest SNR is chosen as output SNR to be used in the next step

ωi= { 1γ i = Max
0 otherwise.

The average output SNR for SC

γ T=[M ∑i=11i≅ Γ (C −ln$M$+1/2M),]

In which C is Euler's constant.The final approximation is valid for M≥3.The overall BER is obtained by bringing together the conditional BER at a certain SNR.In BPSK modulation, the conditional BER is erfc√2γT and the total BER is

BERT = ∫$erfc$ (√2γ T)M[$e\gamma T$/Γ[1 − $e\gamma T$/Γ]M−1$d\gamma$ T.

3.2.EqualGainCombining:

Equal gain combiner(EGC) sets unit gain at each branch to build the normal SNR in the system.In the equal gain combiner,

There is no shut structure answer for the BER for general M, but several researcher shave investigated the BER performance in sever alkinds offading channels[15,16].

3.3. Maximal Ratio Combining: In MRC, receiver linearly combines the received signal ri (t) with ωi, which is the weighting coefficient of the ith branch.The output signal$r$(t) of the linear diversity combiner is the n given.

r (t) =M ∑i=1ω ir (t) =S(t)M ∑i=1ωigi
+M ∑i=1ω in i

As per the Cauchy-Schwarz disparity, MRC with perfect channel estimation has maximum output SNR among all methods if ω is linearly proportional to G.If

ω = G ⇒γ
T = | G GT|2/σ2n GT
G = G GT/σ2n ⇒γ
T =∑ M i=1 |γ i |

The output SNR is, in this manner, the whole of the SNR at every component. By utilizing the above assumption,the expected value of the output SNR is therefore M times the SNR at each branch. For the instance of flawed channel estimation, which is the fundamental issue practically speaking, it is recognizable that the SNR is highly dependent on ωi.Therefore,the optimal solution is the weighting vector,which maximizes the objective function γT in (11). We accept pi is the gauge of the unpredictable addition gi on the ith diversity branch and ei is the estimation error with zero mean and variance

σ2 e =σ 2g (1−ρ2)

where$\rho \in$[0, 1] is the standardized estimation blunder connection coefficient. Under Gaussian error model,i andpi are related as

$$gi = p\ i + e\ i \quad [16]$$

As per the decent variety joining rule, the combiner's loads take on the $\omega i = p * i$ for MRC assorted variety, which depends on the CauchySchwartz disparity, augments (11) if the channel is perfectly estimated(i.e.,ρ=1).However, since channel estimation is often imperfect in practice,the MRC is asuboptimal solution[17–37].

IV.Numerical Results and Discussion

Right now, Carlo re enactment is utilized to present the performance of the proposed ICAbased diversity consolidating strategy and contrast it and PSO, GA, MRC, EGC,and SC method In two if ferments scenario soft the perfect and blemished channel estimation. It is accepted that the average symbol energy

Es =1 and channel gain

AWGN variances are

$\sigma 2\ g = \sigma\ 2\ n$ = 0.5 per dimension.

The parameters for the PSO are N = 25and $c1 = c\ 2$ =2 . It looks at the standardized yield SNR of ICA-, PSO-, and GA-based joining with MRC, EGC, and SC as far as various quantities of decent variety branches when the channel is flawlessly evaluated (ρ = 1) [42]. True to form, it has been observed that the MRC provides the best performance when channel estimation is great.

Nonetheless, the ICA-and PSO-based solutions demonstrate almost the same SNR gain as MRC without the requirement for channel estimation. Since the parameters in every calculation are by and large problem dependent, the set-and-test approach is utilized right now obtain the optimal values for them.In otherwords, $c1r1$ and $c\ 2\ r\ 2$ in PSO or θ, ICA ensure that the particles or settlements would fly over the objective about a fraction of the time.

Right now, condition has been tried independently for parameter as mentioned,and the optimal value is found. The examination between the iterative based calculations and MRC strategies on account of defective channel estimation (ρ = 0, 0.5, 0.75) [43, 44] is outlined. It can be seen that ICA-and PSO-based methods outper form MRC when channel estimation is blemished. The accomplished improvement can be justified by the ability of the algorithms to These two measurements announce that the quality of the diversity performance achieved by

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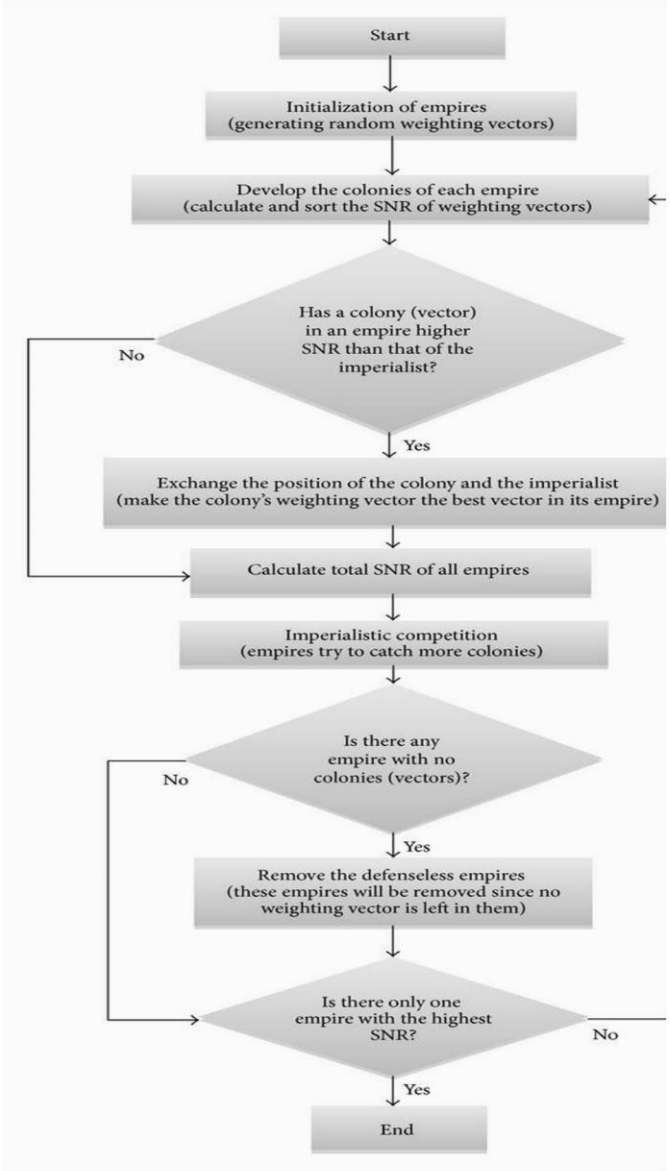
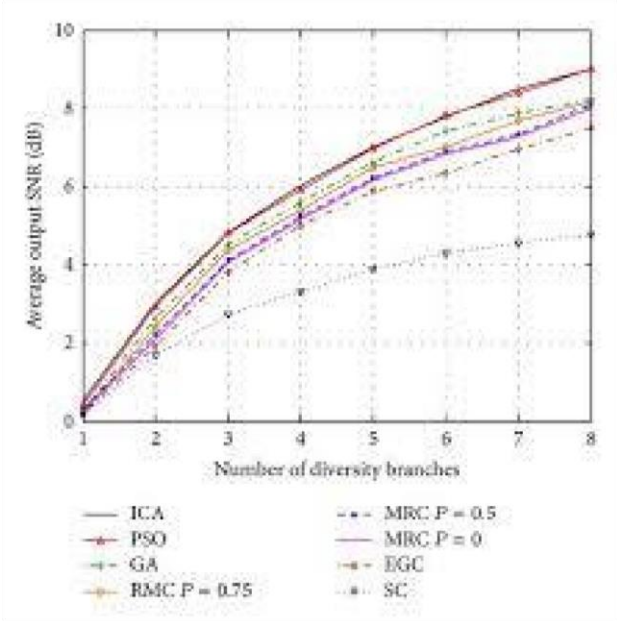
examine the inquiry space altogether and assess the objective function in(11) to maximize the output SNR.Asitis PSO and ICA results are quite close to one another.

Be that as it may, then it present the superiority of ICA over PSO as far as reachable BER and SNR, separately



improved error performance

ICA is very superior to that of PSO.



However,t-test has been completed to give a proof of factual centrality in the distinction of methods for these two calculations. With a significance level of 0.10, it has been found that the two-followed Pvalue is 0.0805, which means that the results are considered statistically significant. Considering the BPSK modulation and imperfect channel estimation, the blunder execution of the MRC-, ICA-and PSO-based strategies for 1, 2, and 3 assorted variety branches is shown. It is perceptible that the bit blunder pace of the ICA-based procedure is significantly lower than that of the MRC.

For example, for a two-branch decent variety, the MRC roughly requires practically 3dB higher SNR than that of ICA-based to accomplish a $BER = 10{-}4$. What's more, as it is appeared, expanding the quantity of branches brings about

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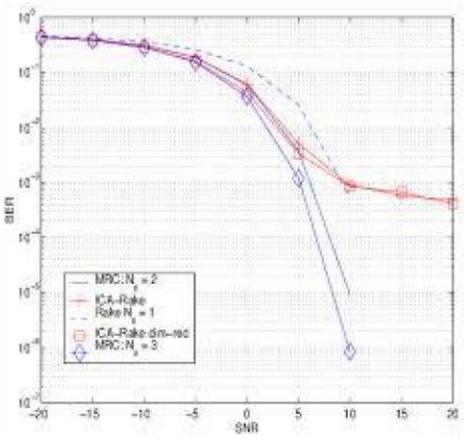

.

Next, thinks about the combination of ICA, PSO, and GA algorithms used in the diversity method. The number of diversity branches is assumed to be 8.The mean and max of each algorithm are achieved when the algorithms run for multiple times. The normal of all outcomes is called mean and the best one among these 100 recreations, which brings about the maximum output SNR, is named as max.As it is shown in the figure, max curve in ICA method converges after 18 iterations where as about 31 iterations of PSO algorithm are needed for convergence.

					SNR dB			
					Pre		Post	
Speech recognition test	Test setting	Type of noise	Experience setting	*n*	*Mean*	*SD*	*Mean*	*SD*
Hagerman	Fast	Steady	Fast	14	0.5	2.5	−0.8	2.4
			Slow	15	0.1	2.6	0.0	3.6
			Total	**29**	**0.3**	**2.5**	**−0.4**	**3.1**
		Modulated	Fast	14	−0.8	3.2	−2.1	3.3
			Slow	15	0.1	4.7	−1.5	3.5
			Total	**29**	**−0.3**	**4.0**	**−1.7**	**3.3**
	Slow	Steady	Fast	14	0.1	2.3	−0.1	2.7
			Slow	15	1.0	3.6	0.4	3.1
			Total	**29**	**0.5**	**3.0**	**0.2**	**2.9**
		Modulated	Fast	14	−1.9	2.8	−2.2	2.9
			Slow	15	−0.9	3.5	−0.6	2.7
			Total	**29**	**−1.4**	**3.2**	**−1.4**	**2.9**
HINT	Fast	Steady	Fast	15	3.5	2.6	2.4	2.4
			Slow	16	1.6	3.3	1.8	3.5
			Total	**31**	**2.5**	**3.1**	**2.1**	**3.0**
		Modulated	Fast	15	3.7	2.6	2.7	2.8
			Slow	16	2.6	3.6	2.0	2.7
			Total	**31**	**3.1**	**3.2**	**2.3**	**2.8**
	Slow	Steady	Fast	15	2.2	2.2	1.5	2.0
			Slow	16	2.8	4.4	1.9	2.3
			Total	**31**	**2.5**	**3.4**	**1.7**	**2.1**
		Modulated	Fast	15	3.6	2.7	2.8	2.4
			Slow	16	4.0	3.8	2.8	3.0
			Total	**31**	**3.8**	**3.3**	**2.8**	**2.7**

This indicates the higher convergence speed of the ICA compared to PSO. the subtleties of combination speed for every technique. The term NA shows that the cycle number for that particular condition isn't accessible.

For example, ICA-based technique with 5 nations can't unite in 100 cycles. In addition, the quantity of wellness evaluations as a parameter to compare the complexity of iterative calculations has been given.

The number of fitnesse valuation is simply the product of the number of ages by which the most extreme SNR wellness is accomplished multiplied by the number of fitnesse valuations per formedin each emphasis. The last equivalents the populace size of any of these calculations.

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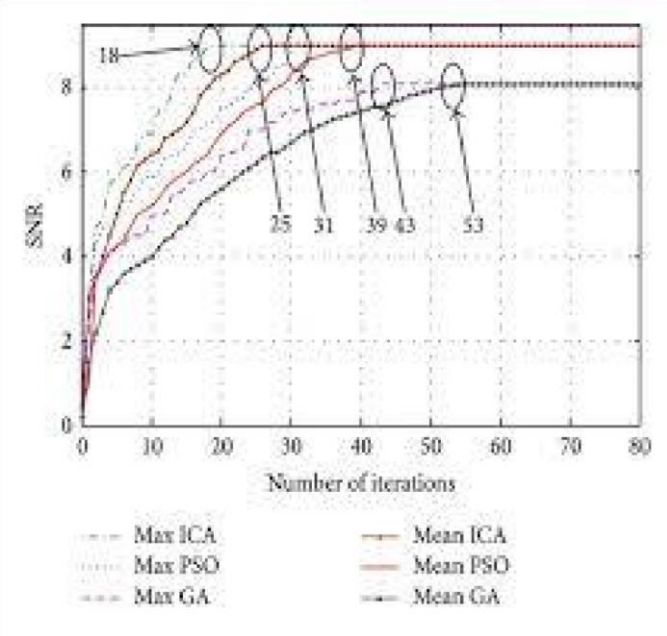

For example, with ICA, the quantity of cycles required to accomplish the most extreme SNR is 18 and the number of countriesis 25 .This means that the number of fitnesse valuations to find the optimal setting is 450,which is considerably low with the advancement of signal processing andcomputing cores.

The SNR fluctuations of ICA, PSO, and GA are appeared and are recorded each five emphasess until the 55th cycle after which the changes are focused when all states, particles, and chromosomes of ICA, PSO, and GA, individually, unite to the same optima. Considering the qualities in the table and ascertaining standard deviations at every cycle, one can presume that ICA, with the entirety of its variances around its mean, can in any case outflank the other two calculations. This approves the predominance of this algorithm in comparison with the other methods.

IV.Conclusion

One of the most significant issues in gathering radio wire decent variety happens when the channel is incompletely assessed. This defective estimation results in obtaining a vector of the weighting coefficient of the combiner that break down the SNR and BER execution of the framework at the collector.To One of the most significant issues in gathering radio wire decent variety happens when the channel is incompletely assessed. This defective estimation results in obtaining a vector of the weighting coefficient of the combiner that break down the SNR and BER execution of the framework at the collector.

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TITLE
ARDUINO BASED AUTOMATIC SOLAR TRACKING SYSTEM WITH MIRRORS

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ABSTRACT:
Due to increase in population and industries electricity demand is increasing day by day. Solar power conversion to electricity through PV cells has become more favored but high priceofcellsandlowerefficiencyhasobstructeditsuseindevelopingcountries.Oneofthewaytoincreasethe efficiency of solar panels is by solar tracking. Through tracking, there will be increasedexposureofthepaneltothesun,makingithaveincreasedpoweroutput.Lowcostreflectingmirrors,lenses and light focusing concentrators may also increase the power output. These mirrors concentrate the light intensity over the whole surface of the panel. Mirror is used as booster to maximize the efficiency. This paper presents the comparison performance of a PV module without trackingand with tracking along withmirror.

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Keywords— solar panel, solar tracking, servo motor, sensor, Arduino

1. INTRODUCTION

Thesunistheprimesourceofenergy,directlyorindirectly,whichisalsothefuelformost renewable systems. Among all renewable systems, photovoltaic system is the one which has a great chance to replace the conventional energy resources. Solar panel directly converts solar radiationintoelectricalenergy.Solarpanelismainlymadefromsemiconductormaterials.Siused as the major component of solar panels, which is maximum 24.5% efficient. Unless highefficient solar panels are invented, the only way to enhance the performance of a solar panel is to increase the intensity of light falling on it. Daniel A. Pritchard (2) had given the design, development, and evaluation of a microcomputer-based solar tracking and control system (TACS) in 1983. It was capableofmaintainingthepeakpowerpositionofaphotovoltaic(PV)arraybyadjustingtheload on the array for maximum efficiency and changed the position of the array relative to the sun. Ashok Kumar Saxena and V. Dutta had designed a versatile microprocessor based controller for solar tracking in 1990 .Controller had the capability of acquiring photovoltaic and metrological data from a photovoltaic system and controlled the battery /load. These features were useful in autonomous PV systems that were installed for system control as well as monitoring in remote areas .Solar tracking was achieved in both open loop as well as closed loop modes. A. Konarand

A.K. Mandal had given a microprocessor based automatic position control scheme in 1991. They had designed for controlling the azimuth angle of an optimally tilted photovoltaic flat type solar panel or a cylindrical parabolic reflector to get the illuminating surface appropriately positioned for the collection of maximum solar irradiance. Eftichios Koutroulis et al. had given the microcontroller based photovoltaic maximum power point tracking control system in 2001. Maximum power point tracking (MPPT) was used in photovoltaic (PV) systems to maximize the photovoltaic array

output power, irrespective of the temperature and irradiation conditions and of the load electrical characteristics. As electricity produced by PV module is directly related to the intensity of light radiation it is receiving, so in order to increase the efficiency of the system a concentrating technique may be a better solution. This would considerably decrease the cost of generationofelectricitybyPVpanels[5].Duetominimumcostandsimplifiedassemblyof reflecting mirrors, conventional technologies make low price manufacturing possible. In this generation, theoretical efficiency of a PV cell is said to be near 25% to 30% while a practical efficiency is around 17% [7]. Ahmed Rhif et al., (2012), International Journal of Control Theory &ComputerModelingVol.2,reviewtheliteratureontrackingprocessforthedualaxissuntracker by a sliding mode control law. Solar trackers are the most appropriate and proven technology to increase the efficiency of solar panels through keeping the panels aligned with the sun's position. Solar trackers get popularized around the world in recent days to harness solar energy in most efficient way. In this paper the design methodology of an Arduino based simple and easily programmed automatic solar tracker is presented. Solar tracking is necessary for most of thesolar systems to collect maximum amount solar radiation. Concentrators require a high degree of accuracytoensurethatthereflectedsunlightisdirectedtotheabsorber,whichisatthefocalpoint of the reflector. Sun Tracker can help increase overall efficiency of a solar installation by over 40%.

2. SOLAR TRACKINGSYSTEM

2.1 SolarPanel

Asolarpanelisasetofsolarphotovoltaicmoduleselectricallyconnected andmountedon a supporting structure. A photovoltaic module is a packaged, connected assembly of solar cells. The solar module can be used as a component of a larger photovoltaic system to generate and supply electricity in commercial and residential applications. Each module is rated by its DC outputpowerunderstandardtestConditSolarmodulesuselight energy(photons)fromthesunto generate electricity through the photovoltaic effect. The majority of modules use wafer-based crystalline silicon cells or thin-film cells based on cadmium telluride or silicon. The structural (load carrying) member of a module can either be the top layer or the back layer. Cells must also be protected from mechanical damage and moisture. Most solar modules are rigid, but semi- flexible ones are available, based on thin-filmcells.

2.2 Principle of PhotovoltaicCell

Photovoltaic (PV) system is well recognized and widely utilized to convert the solar energy for electric power applications. It can generate direct current (DC) electricity without environmental impact and emission by way of solar radiation. The DC power is converted to AC power with an inverter, to power local loads or fed back to the utility. Being a semiconductor device, the PV systems are suitable for most operation at a lower maintenance costs.

2.3 SolarTracker

Solartrackerisadevicewhichisusedtocollectthesolarenergyemittedbythesun.Solartracking is nothing but changing position of panel With respect to sun. Usually photo voltaic module assembled in solar tracker is more powerful than critical irradiance in the fixed system. Solar trackersareclassifiedonbasisofperformance,coastrespectively.Bytrackingsystemwecancatch 40-50% more efficiency compared to fixed panel. Among them dual axis provides increased efficiency of 48% as compared with single axis tracker. Advantages of Dual axis trackers are catching the position of the sun anywhere in the sky due to seasonalvariations.

2.4 TrackingTechniques

There are several forms of tracking currently available; these vary mainly in the method of implementing the designs. The two general forms of tracking used are fixed control algorithms and dynamic tracking. The inherent difference between the two methods is the manner in which the path of the sun is determined. In the fixed control algorithm systems, the path of the sun is determinedbyreferencinganalgorithmthatcalculatesthepositionofthesunforeachtimeperiod. That is, the control system does not actively find the sun's position but works it out given the currenttime,day,month,andyear.Thedynamictrackingsystem,ontheotherhand,actively searches for the sun's position at any time of day (or night).Common to both forms of tracking is the control system. This system consists of some method of direction control, such as DCmotors, stepper motors, and servo motors, which are directed by a control circuit, either digital oranalog.

2.5 Single AxisTrackers

Singleaxissolartrackerscaneitherhaveahorizontaloraverticalaxle.Thehorizontaltypeisused in tropical regions where the sun gets very high at noon, but the days are short. The vertical type is used in high latitudes (such as in UK) where the sun does not get very high, but summer days can be very long. These have a manually adjustable tilt angle of 0 - 45 °and automatic tracking of the sun from East to West. They use the PV modules themselves as light sensor to avoid unnecessary tracking movement and for reliability. At night the trackers take up a horizontal position.

2.6 Dual AxisTrackers

Double Axis Tracker Double axis solar trackers have both a horizontal and a vertical axle and so can track the Sun's

apparent motion exactly anywhere in the world. This type of system is used to control astronomical telescopes, and so there is plenty of software available to automatically predict and track the motion of the sun across the sky.
Dual axis trackers track the sun both East to West and North to South for added power output (approx 40% gain) and convenience

3. Experimental Setup

Solar panel was positioned to the north-southern direction. The reflecting mirrors had attached to the edges of the solar panel. The mirror was aligned in such a ways that maximum amountofsunradiationwasreflectedoverthesolarpanel.Theblockdiagramofthesolartracking systemisshowninFigure1.Withthehelpofmicrocontroller,solarpanelisalignedaccordingto the intensity of the sunlight. Another component is the rechargeable battery which is used tostore energy which is received from the panel. The purpose of the charge control is to control the chargingofthebattery.Microcontrollerunitreceivesthestatusofthebatterybythechargecontrol unit.Ithastwosensors,eachmadeupofLDR.LDRsensestheintensityofsunlightandcontroller receives the output. Control unit decides in which direction the panel has to be rotated to get maximumsunlight.

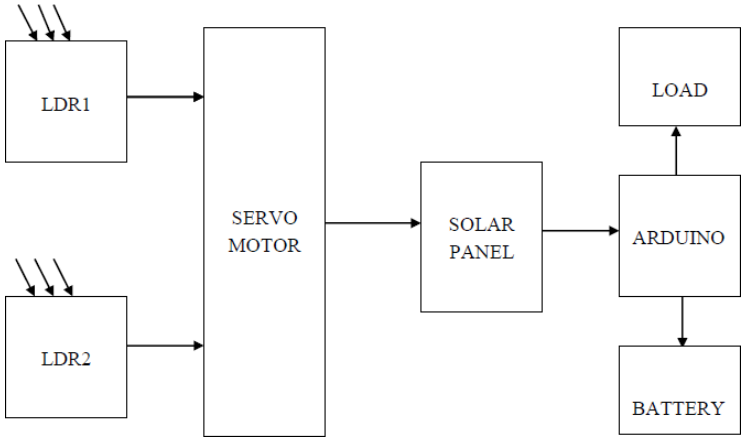

Figure 1. Block diagram of the solar tracking system

4. Results and Discussion

Theexperimentswereperformedonaclearbrightandsunnyday.Theobtaineddata,wasrecorded, and summarized graphically and represented in below Figure (2), (3) and (4)respectively.

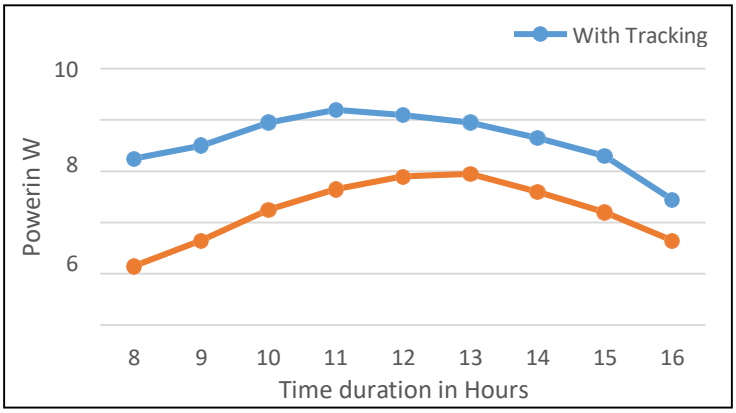

Figure 2. Time Vs Power

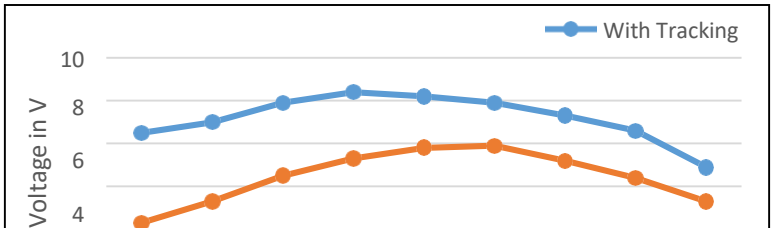

Figure 3. Time VsVoltage

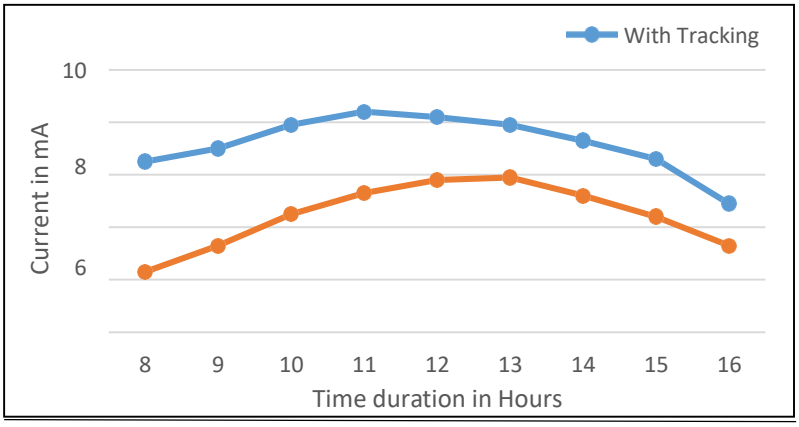

Figure 4. Time VsCurrent

When the day is sunny and clear, it is obvious that radiation intensity will be maximum at noon so the power output will more. Power increases gradually from morning to noon, however, itstartsdecreasingintheafternoon.Infact,improvementofsolarpanelbestoccurswiththemirror during the mid-day. It can be seen from the graphs the output power obtained by with tracking is higher than the power using without tracking during themid-day.

CONCLUSION

Increase in efficiency solar radiation Tracker has played a vital role in increasing the efficiency of solar panels in recent years, thus proving to be a better technological achievement. The vital importance of a dual axis solar tracker lies in its better efficiency and sustainability to give a better output compared to a fived solar panel or a single axis solar tracker. The tracking system is designed such that it can trap the solar energy in all possible directions. Generally, in a singleaxistrackerthatmovesonlyalongasingleaxisitisnotpossibletotrackthemaximumsolar energy. In case of dual axis trackers, if the solar rays are perpendicular to panel throughout the year. Hence, maximum possible energy is trapped throughout the day as well as throughout the year. Thus, the output increases indicating that the efficiency more than a fixed solar panel(about 30 -40%more)

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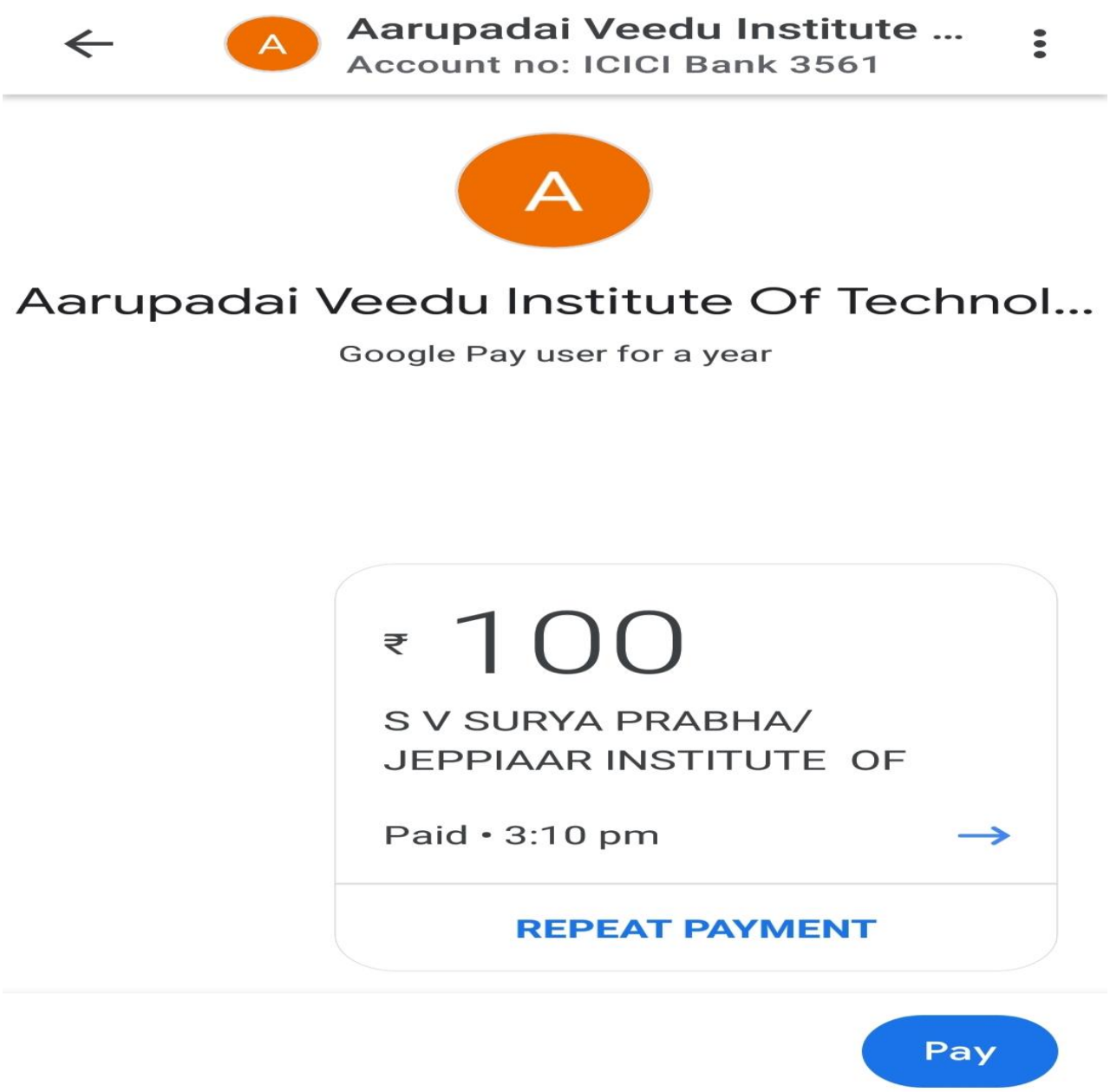

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Paper Code

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TITLE

FALL DETECTION WITH AMBULANCE SERVICE

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ABSTRACT:

An application called a fall detection monitoring system with the identification of the accident location for the people who needs help is developed with Eclipse. In emergency medical services, the lag time between injury and treatment is one of the most critical parameters with respect to patient survivability. Ambulance services aim to maximize the likelihood of prompt medical treatment to prevent death. The main objective of the system is to reduce the time until emergency personnel responds to falls, especially when the victim is unconscious or delirious. A novel algorithm as well as architecture for the fall accident detection and corresponding wide area rescue system based on a smart phone and the fourth generation (4G) networks. To realize the fall detection algorithm, the angles acquired by the electronic compass and the waveform sequence of the triaxial accelerometer on the smart phone are used as the system inputs. Once a fall accident

event is detected, the user's position can be acquired by the global positioning system (GPS) or the assisted GPS, and sent to the coordinator via the 4G communication network so that the user can get medical help immediately

Keywords: Accident appears ,Mobile falldown, Application run background, Send msg to ambulance.

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I. INTRODUCTION

Telemedicine is the new medical technology due to the rapid growth of science and technology in the medical field which offers treatment and health care by using remote communication technology. Computer technology it consists of three parts home terminal, communication network and the monitoring centre.However it has several problems such as it cannot work continuously. Wearable telemedicine technology provides an effective solution to solve this problem and has become a new research hotspot. Medical sensors are embedded into watches or clothes to achieve a kind of noinstructive and non-invasive diagnosis and monitoring.
Wearable medical devices can be connected to the server of healthcare centre through network, falls are one of the major health risks among the older community the high incidences of falls, combined with their associated costs, make it imperative to develop a reliable and effective fall detection solution to provide remote medical help for the elderly. Fall detection system, as a kind of mobile application, can
monitor the user's activities, and will send alert to the admin. The system incorporates an array of features, such as sending alerts, Short Message Service (SMS), and Global Positioning System (GPS) location for easy alerting and monitoring. Different from the research mentioned above, the system identifies falls using both acceleration and angular velocity. And this system can be applied to everyone, not only the elderly

MOTIVATION

ExistingSystem:

Environmental monitoring-based systems that can function only in a predefined space, the wearable sensor-based fall detection systems can function in a larger area. However, most of the wearable sensor-based fall detection systems are made of a self- designed circuit module that should be placed and fastened around certain position, e.g., the chest or the waist, of the user. In addition, how to address the current position of the elderly when a fall accident event occurs is a problem to be solved in wearable sensor-based fall detection systems.

Disadvantages:

- The necessity of wearing an additional sensor module can cause the person feel uncomfortable and lead to certain degree of inconvenience.
- The power consumption burden is another issue that should be treated carefully in mobile devices as well as in wearable sensor-based fall detectors.

ProposedSystem:

In case of any emergency, patient may not be in a state of speaking with anyone or searching through the contact list and calling the desired person. Hence we are developing an application to solve this problem. Ambulance services are important for health & medical facilities. This app will sense the health condition of the user continuously. It will have hospital information.Incase of emergency the system will automatically service which is available nearer to the location of the user to the user relatives as message and call. This will promise a fast and reliable ambulance service in case of emergency.

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Advantages:

- The system identifies falls using both acceleration and angular velocity. The result is positive detection and more accrued.
- Using GPS coordinates it conveys the location to admin. The admin easily find nearby hospitals using these GPS coordinates.
- And this system can be applied to everyone, not only the elderly.

II. METHODOLOGY

The project has two users,

- User
- Admin.

The user logs into their account using email.If the user have not register, they have all the privilege to register themselves in the application. The user login consists of the dashboard with their personal details, then when the user shakes the phone it sends the message and call to the registered contact.

The work of the registered user takes care of the location. Use the provided emergency list and make a call to the nearest hospital.He/She can view the nearest hospital by SMS or has id and password to view the emergency list.

- User
- Admin.

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III. WORKING

Systems analys is the process of observing systems for development purposes.Theanalysisincludessystemstudythatco ntain svariousmodulesinour system,UMLdiagramsexplainingtheworkingofo ursyst emanddatadictionary containinginformationofthedatabasetables.Inour syste m,thefollowingsoftware areused.

SystemStudy

- Customize the basic information
- Monitoring accelerometer
- Triggering of alarm
- Forward alert message with location information
- Emergency list
- Communicating to the hospital

Customize the basic information: Initially the user needs to enter some personal information such as name, email, phone number and location. The purpose of entering the personal details is to help the user to be identified by the admin if the user meets any emergency situation. The information provided by user is stored in server.

Monitoring Accelerometer: Accelerometers measure linear acceleration and tilt angle. Single and multi-axis accelerometers detect the combined magnitude and direction of linear, rotational and gravitational acceleration. They can be used to provide limited motion sensing functionality. For example, a device with an accelerometer can detect rotation from vertical to horizontal state in a fixed location. As a result, accelerometers are primarily used for simple motion sensing applications in consumer devices such as changing the screen of a mobile device from portrait to landscape orientation.

Triggering of Alarm: As soon as the motion is detected after shaking the device, an alarm is programmed to be triggered and a countdown for one minute is started. This delay before sending the message is induced where the user can either choose to disable the alert message from getting delivered by entering the disarm code or if the situation is severe the user can yell out a code which is immediately recognized by the application and send the alert message to the chosen contact immediately. If none of the actions is performed, the message gets delivered after one minute. It is understood that the user is unable to reach the mobile or has fainted due to health issues.

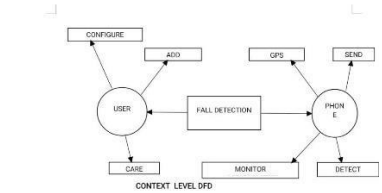
Alert Message with Location Information: An alert message is delivered to the trusted guardian with the location information including the latitudinal and longitudinal details.

Emergency List:Emergency Information module consists of emergency list ofeach user who are using Android application. This information is collected from user mobile. It contains the information of user (i.e) user id, name, email, phone number, location, latitude, longitude. These Information are stored in emergency table. The admin can view the location information in map. The emergency information was implemented in a PC server, which was connected to the Internet and could be accessed via web browsers

Communicating to the hospital: The admin finds the nearest hospital by using latitude and longitude which is sent by user. Coordinator make call to the nearest hospital to take an immediate action.

IV. ARCHITECTURE AND WORKFLOW

The above figure explains the flow of process in our project where patient Fall detection system, as a kind of mobile application, can monitor the user's activities, and will send alert to the admin. The system incorporates an array of features, such as sending alerts, Short Message Service (SMS), and Global Positioning System (GPS) location for easy alerting and monitoring. Different from the research mentioned above, the system identifies falls using both acceleration and angular velocity. And this system can be applied to everyone, not only the elderly.



CONTEXT LEVEL DFD

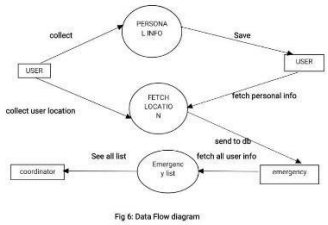


Fig 6: Data Flow diagram

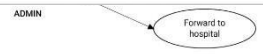


Fig 1: Use case diagram

Use case diagrams are usually referred to as behaviour diagrams used to describe a set of actions (use cases) performed by the user

N

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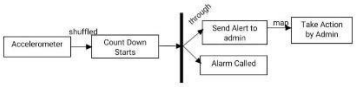

Fig 4: State Chart diagram
The state chart diagram shows the sequence of states that the user goes through during its life in response to outside stimuli and messages.

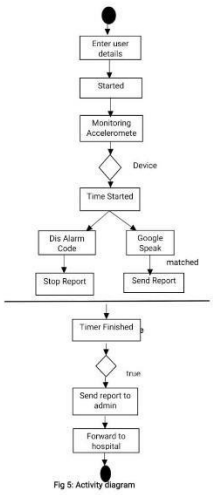

Fig 5: Activity diagram

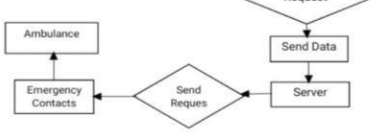

Fig 7: Process Flow diagram

V. RESULTS AND OUTPUT

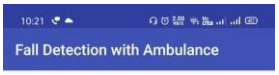

Fig.1 open page

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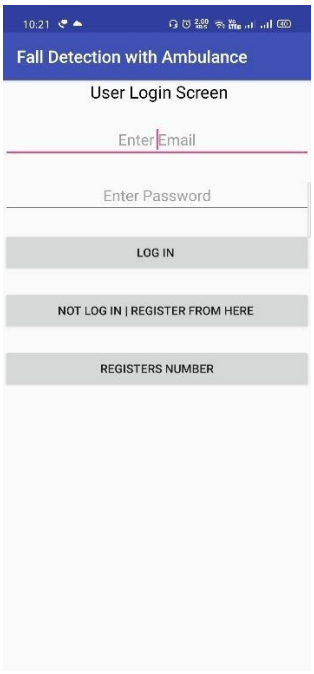

Fig.2 Login page

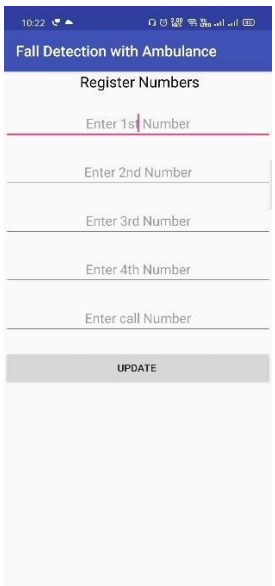

Fig.3 Register page

VI. FUTURE SCOPE

Every work using any technology always can be improved for more and easy use in the future. The project has a very vast scope in future. This application can be updated according to the future requirement for the same arises as it is very flexible in terms of expansion.

The project or application is started on the click of the button, the future work can be
applying a settings button and inside that different categories or fields like child mode, normal mode etc can be placed and from there the function of the app starts.

CONCLUSION

We propose in this paper a smart phone-based pocket fall accidentdetection system. The fall detection algorithm is realizedwith the proposed state machine that investigates the features ina sequential manner. Once the corresponding feature is verifiedby the current state, it can proceed to next state; otherwise, thesystem resets to the initial state and waiting for the appearanceof another feature sequence. To speed up the efficiency of classification process, the early states are composed of simple andimportant features that allow a large number of negative samplesto be quickly excluded from being regarded as a fall event.Those complex features are then placed in later states.

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TITLE

Portable Low Vision Video Magnifier with Voice Output

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Third Author: Reena Gladius K.UG student Jeppiaar Institute of Technology
Fourth Author : *Mary Cynthia S. Assistant Professor Jeppiaar Institute of Technology

ABSTRACT:

A portable Low Vision Video Magnifier is a device for people who disabled from partially visually challenged. It is used to magnify the printed text document into an enlarged one and then changed the actual background color into contrast color, whichever the person feels comfortable. Another added feature is image to speech that scans the entire document and with help of optical character recognition is ready to convert into voice output. This paper represents the application oriented process that gives the accurate magnification in LCD display and image to voice output from speaker. Thus it gives a proper guidance and self-confidence for low vision people.

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Keywords*: *Low Vision, Magnification, Image to Speech, Raspberry pi 3, Magnification signal Processing, Voice Processing, Touchable LED Display, Speaker, OPENCV, andPython.

1. Introduction

In Present days people facing a lot of problems in the eye in such a way the major problem is "low vision" it is in between completely blind person to normal person. It is caused by a major disease called "Retinitis Pigmentosa" Generally our human eye to brain contact nerves are 7 but low vision people have less than 3 or 4, balanced nerves are getting shrink so they unable to read. To overcome this problem introduced a device called "LOW VISION VIDEO MAGNIFIER"

Low vision can have imbalanced thoughts on their real-time life, while they communicate with someone having an improper mindset especially reading purposes. Visually challenged low vision people cannot improve their reading with the help of spectacles. Probably visible distance for them is more or less 3 meter with 10-degree wide view. These issues cause them mentally get stressed and they unable to read any printed material from their own, they need some additional feature like a bright LED light is directly focus on the paper meanwhile it ready to magnify it so that they are able to readaccurately.

The capacity of vision can vary from one person to another, one of them eyesight is different from others eyesight. For that, the device introduced to become an enormous support for the impaired person. It helps to magnify the printed text document into embossed one. It can magnify around 5X then change 7 different types of color whichever the person feels comfortable. Then the device converted the image into voice output so they easily to adapt this device without claiming any other physical helpless. Then it compiles the some of the parts to accomplish in the one sequence manner under one block diagram representation that stimulates accurate result and give the exact output what we prefer in the final outcome. Thus the following methods to conquer the process of magnifier and voiceoutput.

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2. Methods

It consists of two parts first is “Magnification” and second is “Text – to – speech”.

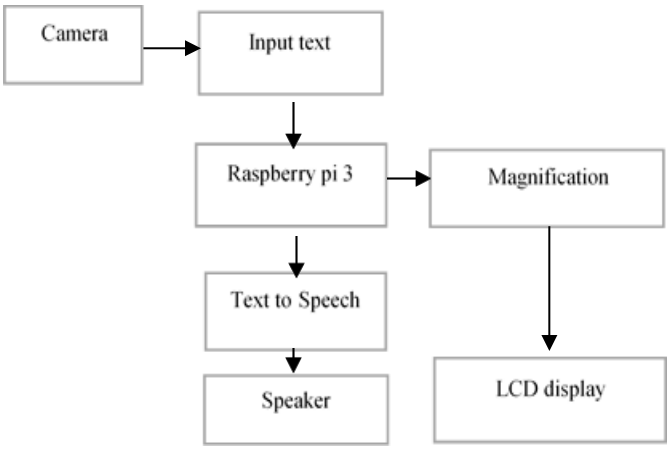

Fig. 1: Block Diagram Representation of Low Vision Magnifier with voice

A. Magnification

It consists of three main modules, image processing magnification module and color changeable module. Image processing module set the object position and focuses the text with help of a camera and magnifies the image of into 5X. Then it can change into 7 different color whichever the person feels comfortable.

A.1. MagnificationModule

A handheld magnification device for displaying a magnified representation of an object in a see-through manner is provided. The handheld magnification device also includes a distance-sensitive sensor for measuring a distance parameter representative of a distance between the object and the handheld magnification device, as well as a processing unit for

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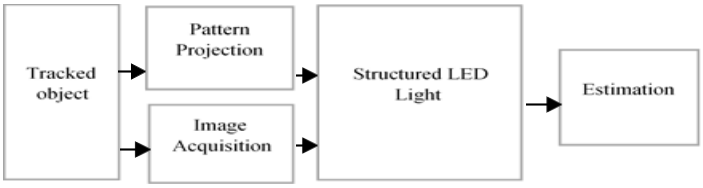

automatically selecting, based on the distance parameter. The handheld magnification device further includes a display for displaying the magnified representation of the object based on the image acquired by the selectedcamera.

Thus the portable magnifier stimulates the hand free and easy to move with the weightless body, to show the nature how it proceeds in the day to day life when the visually impaired try to use this most valuable functional product to survive them in future.

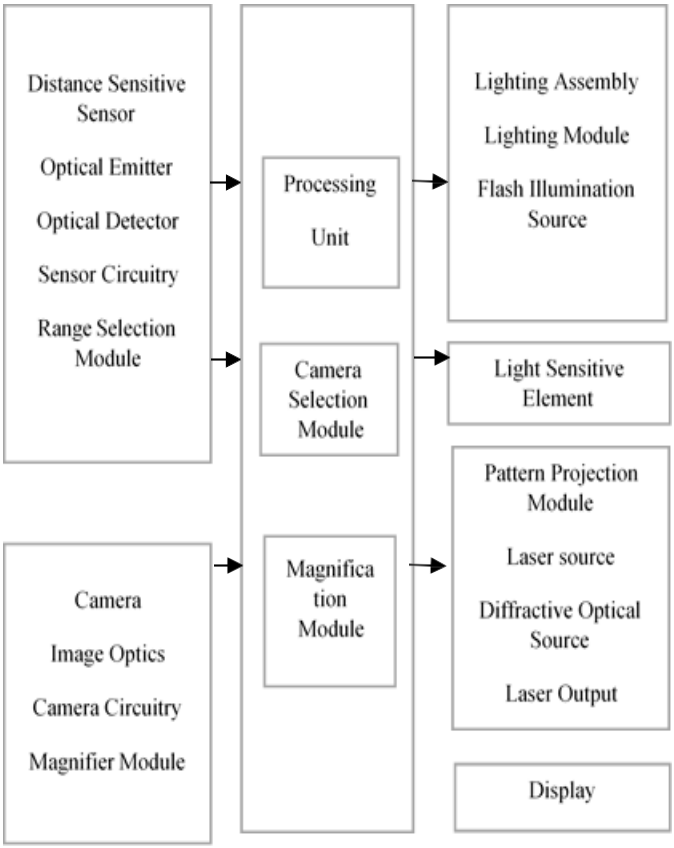

Fig. 2: Block Diagram of Magnification

A.1.1 Distance SensitiveSensor

The distance-sensitive sensor works as a laser triangulation sensor that calculates the distance that obtains the target in the CMOS chip and a known angle

A.1.2 Range SelectionModule

The range selection module is the tool for selecting the ranges to display with the margin of the magnifier. It provides the touchable on-screen board to select the pre-configured range in the magnifier.

Fig. 3: Block Diagram of Range Selection Module

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A.1.3 Light SensitiveElement

The light-sensitive element display the selected interval of the liquid crystal display device has comprised the front electrode layer. The liquid crystal material located in-between front electrode layer and the rear electrode layer. To obtain and change the polarization the electrical potential is changed between the front electrode layer and the rear electrode layer to selectively modify the portion of the liquid crystaldisplay.

A.1.4 Pattern ProjectionModule

Pattern projection module includes the arrangement of series to diffract an input beam of radiation. It consists of two type of diffracted optical element. The first DOE represent that to apply the input beam of a pattern with a specified divergence angle similarly the second DOE configured that to split the input beam into a matrix of output beam with a specified out angle

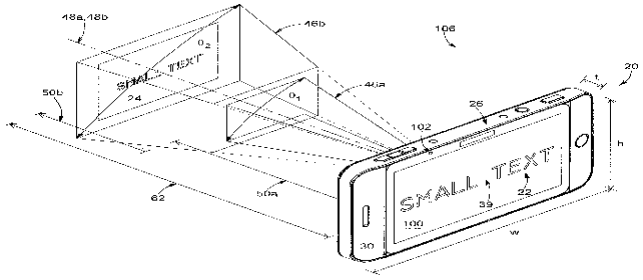

Fig.4: Design of video Magnifier

A.2. Color ChangeableModule

Choose the text color of an element based on the background color. If the background is dark, the light text is chosen. If the background is light, they use dark text. This is because light and dark contrast well with each other and make text easier to read. So can we use Sass to choose the appropriate text color for a background? We have three types of notifications: confirm, warning, and alert. We'd like them to have different color backgrounds. Green for confirmation, yellow for warning, and red for the alert. And we want the text contrast well with the background. Here we've used the Sass lightness () function to determine which color is more appropriate for a background. The lightness () function is a built-in Sass function that returns the lightness of a color's RGB value between 0 and 100. Where 0 is the darkest and 100 the lightest. So in our function, we receive a color, and if that color's lightness value is greater than50, meaning it's a light color, we return a dark value to ensure a good contrast. Otherwise, we return a lightcolor.

Magnification graph

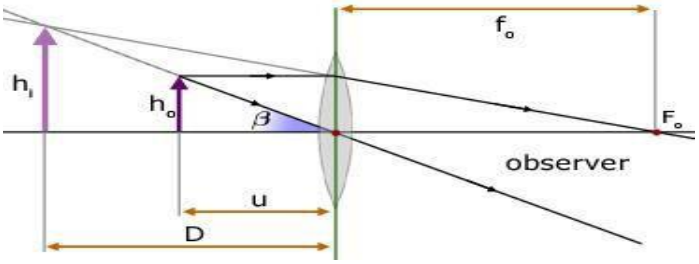

Fig.5: Graph of Magnifying View by User

B. Image toSpeech

It contains three major modules, the image processing module, the word checking module, and voice processing modules. Image processing module focuses the exact portion of the document then capture the text with help of the camera and take a picture then transferred the image into the word document. Word Checking module checks the output of image processing whether any unwanted letter is misplaced is being clarified and give accurate clarity message output. Then passes to Voice processing module it changes the written document into sound and process it with specific physical characteristics so that the sound can beaudible.

B.1. Image ProcessingModule

OCR or Optical Character Recognition is a technology that automatically recognizes the character through the optical mechanism, this technology imitates the ability of the human senses of sight, where the camera becomes a replacement for eye and image processing is done in the computer engine as a substitute for the human brain. Tesseract OCR is a type of OCR engine with matrix matching. The selection of Tesseract engine is because this machine has been widely accepted in the world, as well as the flexibility and extensibility of these machines and the fact that many communities are active researchers to develop this OCR engine. Machines still have defects such as distortion at the edges and dim light effect, so it is still difficult for most OCR engines to get high accuracy text. It needs some supporting and condition in order to get the minimaldefect.

B.1.1 SpecifiedObservation

The device is designed based on the following restrictions:

a. Distance of reading an image contain text is maximum 10-15 cm.
b. There is no measurement for the reading material, it is flexible for anythickness
c. In vertical facing the minimum wide view of the image line 4-6 degree.
d. Maximum size of reading material is aparagraph.
e. Characters size is minimum of 10 pt.
f. There is no format or style of alphabets to read like Calibri, Aharoni, Batang, etc. It is easily to read all type ofcharacter.

B.1.2 Hardware DesignProcess

In Raspberry Pi camera have not occurred an auto adjustment for that user take a step to focus on the exact image. In dullness or dim light surface, the low vision unable to read clearly for that it is necessary to have LED light to focus on the image.

B.1.3 Tesseract OCR Implementation

The camera captured the input image, its size has 5MP resolution with interface type are CSI (Camera Serial Interface) and dimension are 25x23x8(LXWXH) mm. It has supported video format are 1080p at 30fps, 720p at 60fps and 640x480p, 60/90 video. The Tesseract Optical Character Recognition implements the pitch and dimension to endeavor the image as gray by region ofinterest.

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B.1.4 Software DesignProcess

The process of software design has image as an input is transferred into word document format.

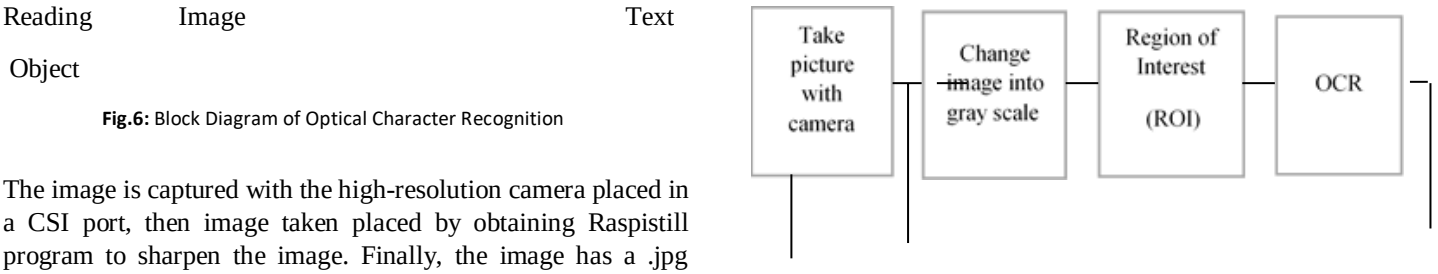

Fig.6: Block Diagram of Optical Character Recognition

The image is captured with the high-resolution camera placed in a CSI port, then image taken placed by obtaining Raspistill program to sharpen the image. Finally, the image has a .jpg format with a resolution of 2592x1944 pixels

B.2. Word RectificationModule

The word rectifying module plays a vital role in the text-to-speech process. The user by mistake entered the misspelled word, on that place it will highlight and replace it an incorrect word. For that process be handled by following steps to identify the mismatched word. The most needed or appropriate approach is error correction algorithm is used to point it out where the exactmistake.

B.2.1 Word Rectification Moduledesign

In order to improve the accuracy, the word rectification module is a base one for conversion of image text into voice process. Image processing module shows that given input image converted into text then check each and every word inappropriate scenario and update the exact word. Image processing module represents that misspelled or wrong word are also originated then rectified the mistake and update the proper word in the right place. The following steps undergo the rectification process. Generally we know list of words called as paragraph

a. The given paragraph be scanned then break the paragraph into number of words.
b. Again break the number of words into eachletter.
c. Check individually whether any punctuation mark at the end of the word.
d. Then check any name undergo uppercase letter format in thesentence.
e. Finally split the words into two style of format, first case shows that in the given word doesn't take place any operation means simply run the entire paragraph, while any special character represents means these kind of above steps are occurred.

Therefore according to the word correction module, the implementation of voice processing module is the additional feature to deliver the error-free output and hear the sound inaudible voice with any irritation. These are some of the

processes to illustrate the resource factor of the rectification module.

B.3. The Voice Processing Module

B.3.1 Image-to-speech

Image to speech is the process that obtains the following steps to accomplish in various scenario but for our concern the voice processing module access the major process while we determine image as an input in the form of eSpeak algorithm that taken place in the similar manner of phoneme codes concepts but eSpeak algorithm can be visualized in normal eyesight why because it is given by user to type the key to press the words that will automatically convert into voice. They are some of the initial steps to occur the audible sound. There are text-to-speech, image-to-speech, text-file-to-speech, and direct image freeze to the text are taken place. All these steps are the upcoming process that considers in one flow of manner to illustrate the sequence of text and image invoice process. Thus the eSpeak algorithms are written in the python 3 codes to present their voice. The python codes are list of manner to deliver the result are python3 index.py is the keyword that appears in terminal entry, while open the terminal first point it out present working directory, then change the directory with command line and it has to type code then specify where we saved the image file and give the listing area finally update the source with virtual wrapper and activate the source code and then capture the image file. Thus the following steps are to give the way for voiceoutput.

i Text to Phoneme converter

The given original text is ready to convert into an alphabetic code called as International Phonetic Alphabet [IPA]. From that IPA format is used to convert into phonetic code with pitch and duration are automatically taken placed. This part of the section is a pure language orientedprocess.

ii Phoneme to Speech converter

The outcome of phonetic codes obtain in the phonetic nature from that with help of OCR with the same pitch and duration is converted into voice process.

Input Text	Text to Phoneme	Phoneme to Speech
Phoneme	IPA	Example
AA	A	odd
AE	Ae	at
AH	V	hut

Fig.8: Tabulation of Phonetic Codes

B.3.2 DesignImplementation

The voice processing module diagram implements that the conversion has happened in the background only, it cannot visualize when we capture the image only freeze out image are scanned out and ready to read it out. The phoneme codes are unable to visualize while when python running in the background these phoneme codes are also running in sequence manner. For that, the above table is the examples of phonetic word conversion issituated.

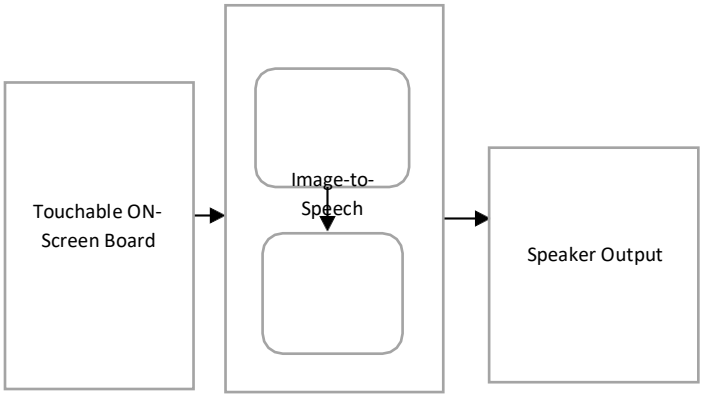

Fig.9: Design of voice processing

i Touchable on-screenboard

The first block shows touchable on-screen board which is used to press the key like pause, stop, up arrow and down arrow etc. It also represents the aquatic keypad to type the character. Initially, we put the Raspbian OS then OpenCV and python software in sequence manner. From python codes these kinds of the touchable mechanism are satisfied. Similarly, GPIO pin has operated these function. Python 2.7 is much more helpful for thesefunctions.

ii SingleBoard

The above functionality is operated in a single board with 32 GB SD package, the memory plays a vital role to accommodate theseprocess.

iii Speaker Output

Finally, image to speech process is applied with python codes, copy the entire path where we saved, then type which text document to read it immediately it will scan and give a voice.
Thus the above process deliver the following steps to conquer the systematic adaptation in correspondingblock.

3. Result

The outcome of this paper are considerably a user friendly process, the low vision try to manage the function and activities by themselves without aiding anyone. It is a massive project ends with prolonged consistency with the help of main key factor is “Raspberry pi 3”. It is the heart of this process to address each and every one in single control unit. The board is specially a mother board which contain the 1.2 GHz Quad-core with 64 bit processor. It contains the camera connector which have 15-pin MIPI Camera serial Interface (CSI-2) used to capture the enough number of images and store into the SDcard.
Thus magnify an object by measuring a distance with distance ·sensitive sensor and then captured the image get stored andread
it into voice output. These are experimentally designed and obtained a result in the real time application. Some of the images are listed below are designed and present it for display.

4. Conclusion

Thus the portable low vision video magnifier is moreover useful for all kind of visually impaired low vision people especially some differentially abled people who are suffered from cerebral palsy diseases. It supposed to magnify the entire image into an enlarged one and convert into the voice output. Thus image- text- file- to-speech is an additional feature for low vision, while they relieve in stress and become a challenging person for everyone and then they survive anything individually without dependent of other and go ahead of their goal in a pleasant way.

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COAL MINE SAFETY SYSTEM USING RASPBERRY PI

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ABSTRACT:
A smart helmet has been developed that is able to detect the hazardous events in the mine industry. In the development of helmet, we have considered three main types of hazard such as air quality, helmet removal, and collision. The first is the concentration level of the hazardous gases such as CO, SO2, NO2, and particulate matter. The second hazardous event was classified as a miner removing the mining helmet off their head. Temperature and humidity sensor are used to measure the surrounding environment condition. The third hazardous event is defined as an event where miners are struck by an object against the head with a force. An accelerometer was used to measure the acceleration of the head and the HIC was calculated in software. Tests were successfully done to calibrate the accelerometer. The experimental prototype consists of three sensors namely gas, infra-red and proximity sensor for their usage and the sensor data are monitored in pc via ZigBee transceiver unit. From IoT server, sms are sent to the particular person.

COAL MINE SAFETY SYSTEM USING RASPBERRY PI

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concentration level of the hazardous gases such as CO, SO2, NO2, and particulate matter. The second hazardous event was classified as a miner removing the mining helmet off their head. Temperature and humidity sensor are used to measure the surrounding environment condition. The third hazardous event is defined as an event where miners are struck by an object against the head with a force. An accelerometer was used to measure the acceleration of the head and the HIC was calculated in software. Tests were successfully done to calibrate the accelerometer. The experimental prototype consists of three sensors namely gas, infra-red and proximity sensor for their usage and the sensor data are monitored in pc via ZigBee transceiver unit. From IoT server, sms are sent to the particular person.

Keywords: Arduino, sensors, zig-bee

I . INTRODUCTION

South Africa is known for its extensive and diverse mineral resources and large mining industry [1]. Supervisors are held responsible for all injuries sustained under their supervision, and should therefore be aware of potentially risky situations [1]. The problem addressed here was the improvement of a

mining helmet in order to ensure more safety awareness between miners. When working with noisy equipment, being aware of one's surroundings can sometimes be challenging [2]. In the mining industry miners tend to remove some of their safety gear because the gear is too heavy, warm or uncomfortable to work with. However, miners generally do not remove their helmets. Presently mining safety helmets only have the purpose of protecting the miner's head against potential hazardous bumps. The safety helmets do not have any technology added to it to let miners know when a fellow miner has encountered a hazardous event. Therefore, the purpose of the project is to modify an existing mining safety helmet to make the helmet even safer by adding a wireless sensor node network. The task was extended to designing the system small enough to fit into the safety helmet and last long enough while running on battery power. A further challenge was to modify the helmet without changing its physical structure. The added weight had to be kept to a minimum. A mining helmet needs to be modified to improve miner safety by adding intelligence to the helmet. When a miner removes his helmet he needs to be warned. If an object falls on a miner even when wearing his helmet he can become unconscious or immobile.

The system must determine whether or not a miner has sustained a life-threatening injury. These two events are defined as hazardous events. Thirdly, dangerous gases need to be detected and announced. In the area of mining technology, real-time monitor and control of

mine hazard are more complex. Mine safety modules are configured to communicate to ground control or a central station. A real critical issue in mines is hazardous gases. Systems used in a mine can create intense vibrations and increase the level of hazardous gases such as CO, SO2, NO2 and particulate matter. The working conditions can be very noisy and miners don't watch each other constantly. Miners tend to stay in groups and will be no more than 5 meters (m) from each other. A warning system needs to be incorporated that will warn miners within a 5 m radius that a miner is experiencing a hazardous event. This system needs to process and transmit the event within 1 second (s). These systems measure the environment around the miner with gas sensors and are then used to implement evacuations. These do not alert the miner at all or only alert the miner in an audible way. These systems warn miners, but when a miner is obstructed or injured, an external input is required from ground control.

II.SYSTEM DESCRIPTION

A) Arduino

Arduino is an open source, computer hardware and software company, project, and user community that designs and manufactures Single-board microcontrollers and microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical world.

Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online.

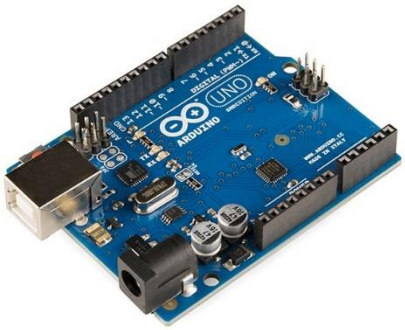

Fig. Arduino

B) Temperature sensor

A temperature sensor is a device, typically, a thermocouple or RTD, that provides for temperature measurement through an electrical signal. A thermocouple (T/C) is made from two dissimilar metals that generate electrical voltage in direct proportion to changes in temperature.

C) Humidity sensor

A humidity sensor senses, measures both moisture and air temperature. The sensor is composed of two metal plates and contains a non-conductive polymer film between them. This film collects moisture from the air, which causes the voltage between the two plates to change. These voltage changes are converted into digital readings showing the level of moisture in the air.

D) Gas sensor

MQ-2 gas sensor is designed with sensitive material of sno2, which with lower conductivity in clean air. When the target combustible gas exists, the sensor's conductivity is higher. Signal conditioning circuit is used to convert the change of conductivity to correspond output signal with the input gas concentration. MQ-2 gas sensor has high sensitivity to LPG, Propane and Hydrogen, also could be used to Methane and other combustible steam, it is with low cost and suitable for different application.

E) MEMS sensor

The MEMS is a pressure sensor in respiratory monitoring are used in ventilators to monitor patient's breathing. It is also known as 'microsystems' or 'smart' sensors, are able to gather information from the environment, thermal, chemical, optical, or magnetic phenomena.

III. METHODOLOGY

a) Temperature detection

The temperature sensor monitors the temperature level in the surrounding. If it detects a rise in temperature level then the predefined level then it gives a output signal through the output device by the Arduino.

b) Gas detection

The gas sensor monitors the gases around it. It checks for the presence of any hazardous gases such as LPG, Propane, Methane, hydrogen and carbon monoxide, that can harmfulness to human beings. If it detects then the Arduino will give an output signal.

c) Buzzer

The buzzer is an output device. When there is rise in temperature or presence of poisonous around the worker it is indicated to them with a buzzer sound. It helps to prevent them from upcoming danger.

d) Zig-bee

ZigBee is an open global standard for wireless- technology designed to use low-power digital radio signals for personal area networks. ZigBee operates on IEE 802.15.4 and is used to create networks that require a low data transfer rate and energy efficiency. By this device the monitored details of temperature and gases are transmitted to the receiver.

IV.EXISTING METHOD

Previous system was not accurate. The transmission rate was slow. Time to take help measures was late. The workers were unaware of the danger. So we implemented the helmet with sensors to detect the gases and humidity change. So that the worker is notified and alerted. The existing systems mode of transmission for data was slow compared to the proposed system. The success rate of helping the workers were low.

So, our project was insisted to help the workers and predict the dangers as soon as possible. Since the data were also transmitted to receiver in other part the rescue measures were easy.

V.PROPOSED METHODOLOGY

The below block diagram explains the proposed method. The various sensors are attached to the Arduino board which senses various abnormalities in the surrounding. Then it transmits the received data to receiver. Then the receiver receives and stores data for future use.

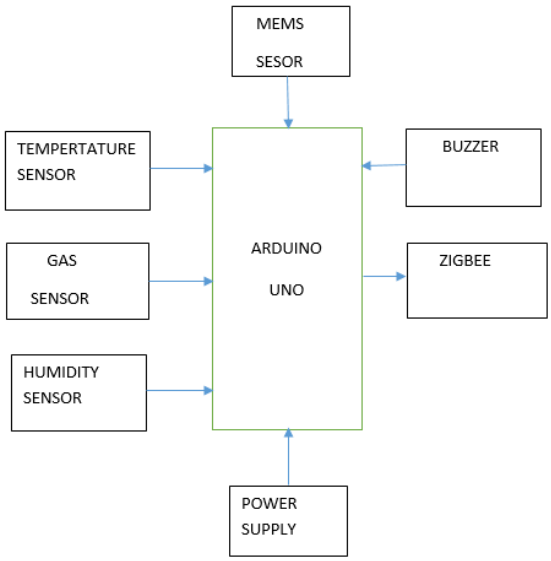

Fig. block diagram of transmitter

Fig. block diagram of receiver

VI.IMPLEMENTATION RESULT

The MEMS sensor, temperature sensor, gas sensor has been attached to the UNO module. When they the detect the harmful gases, rise in temperature, removal of helmet it is indicated to the worker by a buzzer sound through the buzzer attached to the UNO. By these detection life of worker can be saved and further precautions can be taken.

VII.CONCLUSION

A brilliant protective cap has been built up that can distinguish of dangerous occasions in the mines business. In the improvement of head protector, we have considered the three principle sorts of risk, for example, air quality, cap evacuation, and temperature rise. The first is the fixation level of the unsafe gases, for example, CO, SO2, NO2, and particulate issue. The second risky occasion was named a digger evacuating the mining cap off their head. IR and PIR sensor are utilized to identify if any snag is present in the posterior or people it and will notify it. The third unsafe occasion is the sudden rise in the temperature which may lead to problems. The trial model comprises of three sensors to be specific gas, infra-red and temperature sensor for their utilization and the sensor information are checked in PC by means of zigbee handset unit.

VIII.SUGGESTIONS FOR FUTURE WORK

The future scope is to add further more sensors which can help in monitoring the health condition of workers. Also the device shouldn't be heavy it should be made as lightweight so that it can be easy for the workers to carry, also it will not cause any trouble while working. The workers should be more precautious about the surrounding to save their lives.

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TITLE
Detecting Lung Malignant growth using ANN

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ABSTRACT:

Lung Tumors can be kindhearted or threatening. Kindhearted tumors can be evacuated and don't spread to the pieces of the body. Threatening tumors regularly can spread forcefully and cause passing. Early finding of lung disease can help specialists to treat patients and keep them alive. The illnesses, for example, pleural emission and ordinary lung are distinguished and arranged right now. This paper presents a PC helped grouping Method in Computer Tomography (CT) Images of lungs created utilizing ANN. The reason for the work is to identify and order the lung infections by viable component extraction through a Transform method called Gabor Wavelet and LBP. NN classification has been designed for Artificial Neural Network of ILD patterns, by which malignant melanoma and benign lung cancer could be detected and classified and the condition of the lung can be identified as normal or abnormal.

Detecting Lung Malignant growth using ANN

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Abstract

Lung Tumors can be kindhearted or threatening. Kindhearted tumors can be evacuated and don't spread to the pieces of the body. Threatening tumors regularly can spread forcefully and cause passing. Early finding of lung disease can help specialists to treat patients and keep them alive. The illnesses, for example, pleural emission and ordinary lung are distinguished and arranged right now. This paper presents a PC helped grouping Method in Computer Tomography (CT) Images of lungs created utilizing ANN. The reason for the work is to identify and order the lung infections by viable component extraction through a Transform method called Gabor Wavelet and LBP. NN classification has been designed for Artificial Neural Network of ILD patterns, by which malignant melanoma and benign lung cancer could be detected and classified and the condition of the lung can be identified as normal or abnormal.

1. INTRODUCTION

Lung malignant growth [1] has gotten one of the most critical sicknesses in mankind's history. It has been guessed that picture which are in quantitative include examination can be advance demonstrative/analytical or prescient exactness, and in this manner will affect a critical sum of patients. In the present investigation, standard-of-care clinical figured tomography (CT) examines were utilized for picture highlight extraction. So as to lessen inconstancy for include extraction, the first and fundamental advance is to precisely depict the lung tumors. Exact depiction of lung tumors [2,3] is likewise pivotal for ideal radiation oncology. A typical way to deal with depict tumor from CT examines includes radiologists or radiation oncologists physically drawing the limit of the tumor. In most of cases, manual division overestimates the sore volume to guarantee the whole injury is distinguished and the procedure is profoundly factor. A stable precise division is basic, as picture highlights, are delicate to little tumor limit changes. In this manner, an exceptionally programmed, precise and reproducible lung tumor outline calculation would speak to a critical development.

Precise extraction of delicate tissue injuries from a given methodology, PC helped medical procedure, radiation treatment arranging and clinical research. In any case, division of an injury is ordinarily a troublesome undertaking because of the huge heterogeneity of disease sores, commotion that outcomes from the picture securing process and the qualities of sores regularly being fundamentally the same as those of the encompassing typical tissues. Conventional clinical picture division systems incorporate force based or morphological strategy yet these strategies in some cases neglect to give exact tumor division.

The utilizations of mechanized tumor division are huge, which incorporate estimating treatment reaction, making arrangements of radiation treatment, and to encourage extraction of solid capacities for over the top throughput radiomics. Manual depiction of tumor volumes is amazingly arduous and prior examinations have indicated that semi- electronic pc-produced divisions are more repeatable than manual outlines particularly for radiomics investigation. Agent semi-robotized tumor division systems applied to lung malignant growths incorporate unmarried-click troupe procedures and marker oversaw watershed strategy. In any case, such techniques while applied to lung knob division produce shifting outcomes. Intelligent systems that adjust their division to client inputs experience the ill effects of between rater changeability.

2. EXISTING SYSTEM

a. DISCRETE COSINE TRANSFORM

In [15,16], Picture Compression utilizing the Discrete Cosine Transform (DCT) is a method for changing over a sign into rudimentary recurrence segments. It is broadly utilized in picture pressure. Here we build up some basic capacities to process the DCT and to pack pictures. These capacities represent the intensity of Mathematica in the prototyping of picture handling calculations. The fast development of computerized imaging applications, including work area distributing, interactive media, video chatting, and top-notch TV (HDTV) has expanded the requirement for powerful and institutionalized picture pressure methods. Among the rising benchmarks are JPEG, for pressure of still pictures; MPEG, for pressure of movement video; and CCITT H.261, for pressure of video communication and remotely coordinating.

Every one of the three of these norms utilize a fundamental method known as the DCT. The DCT is a nearby relative of the DFT. Its application to picture pressure was spearheaded by various researchers. These capacities are utilized to investigate techniques for advancing picture pressure for the human watcher, utilizing data about the human visual framework.

b. K-NEAREST NEIGHBOR (KNN)

KNN is a straightforward calculation [17] that stores every single accessible case and groups new cases dependent on comparability measures (e.g separation, work). KNN is a non-parametric directed learning system in which we characterize the information point to a given classification with the assistance of preparing set. Expectations are made for another occurrence (x) via looking through the whole preparing set for the K most comparable cases (neighbors) and condensing the yield variable for those K cases. In grouping this is the mode (or generally normal) class esteem. Its motivation is to utilize a database where the information focuses are isolated into a few classes to anticipate the order of another example point.

PROPOSED SYSTEM

The proposed system consists of following units.

a. PRE-PROCESSSING UNIT

Pre-preparing unit is utilized to change over the given info picture according to the prerequisites of framework. Right now and transformation of RGB picture to highly contrasting picture is finished.

b. GABOR-WAVELET UNIT

Gabor-wavelet is utilized for dissecting recurrence properties. They are utilized to choose highlights, for example, edges, corners, surfaces from the picture.

c. LOCAL BINARY PATTERN UNIT

It is utilized as picture descriptor to naturally order and recognize surfaces and examples in pictures. It extricates highlights from the pictures. A LBP esteem is determined and put away in yield cluster.

RESULTS AND DISCUSSIONS

The fundamental favorable position of neural systems is the reality, that they can utilize somewhere in the range of an earlier obscure data covered up in information. Procedure of 'catching' the obscure data is called 'learning of neural system' or 'preparing of neural system'. Figure 1 represents the conversion of RGB image into grey scale image.

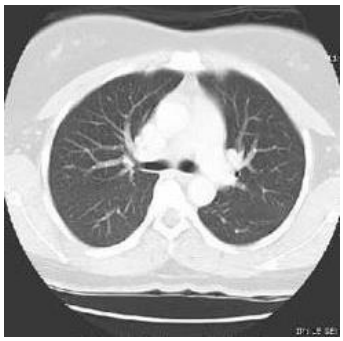
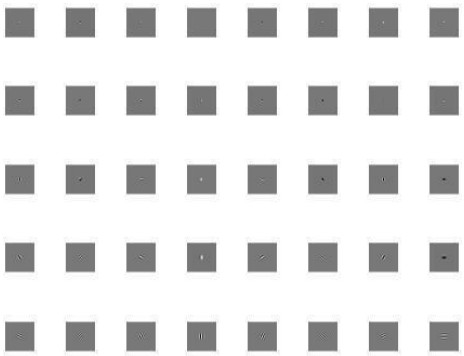


Fig. 1 Gray Scale Image

GABOR WAVELET TRANSFORM IMAGES

Figure 2 represents the real part of 40 2D images Gabor wavelets with 5 scale and 8 orientations. Gabor wavelet is used for the convolution and the resultant is used for getting the frequency information. The information near the center of gaussian are used and they are encoded whereas those which are present at the far do not have any impact.



5. CONCLUSION

The proposed framework utilizes picture handling to recognize and group the tissue development in lungs dependent on its inclination. The proposed approach includes three stages. In the initial step highlights are chosen utilizing Gabor Wavelet change method. In the subsequent advance highlights are extricated utilizing Local Binary example procedure. In the third step preparing of system and grouping is performed utilizing fake neural system. It would help specialists to analyze tissue development in lungs rashly and accurately which likewise spares time and cost. The incomparable goal of our paper is to upgrade the diagnostics framework in the clinical field.

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TITLE
DYNAMIC LOAD BALANCING IN LTE NETWORK

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ABSTRACT:

To accommodate excessive charge together plus capacity in the fifth Generation communication systems, tailored usage of Time-Frequency resource. Initially, we think about joint transmission which is one of the coordinated approaches, with which a consumer can also be concurrently served by Heterogeneous base stations. Second, we document for, the merging relation between the central station load levels that are subordinate to every different due to inter-cell interference. We formulate two optimization issues, lost and most load minimization. we suggest a combined integer linear programming primarily based schemes by way of skill of linear. This strategy additionally leads to a spring pattern for achievement law. Then, we derive a set of sectional action. Attainment of the conditions assurance fulfills the improvement of each Minimum of sum load and Minimum of maximum. The key result is then developed based totally on the actions. Simulation consequences are contributed to revealing the effectiveness of the approaches. Key Words: joint transmission , cellular networks, base station, interference, linear User Equipment. After developing a Network we have to link the cells and User Equipment using a code. it is about developing the spectral capability of complete range .Employing a

merge of macro contains relay base stations, heterogeneous networks empower flexible and low-cost distributions and produce constant broadband distributions to customers in all places in the network. This paper discusses the demand for an alternative deployment model and topology the usage of heterogeneous networks. To enhance the execution of these networks, foremost techniques are explained, which are imperative to govern and manage interference and carry the entire boon of such networks. Range expansion allows more user stations to advantage precisely from low-power base stations contain relays. Adaptive inter-cell interference organization provides daring resource share to the interfering cells and improves inter-cell. We will define two multi objective optimization problem, which is Minimum of sum load and Minimum of Maximum load .The Solution to the Minimum of Maximum Load problem gives the association

Which minimizes the maximum load between the cells? The solution to the Minimum Total Load problem gives the affiliation which minimizes the total load throughout the network.

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1. INTRODUCTION

Following the innovation of smart phones and tablets, the demand for worldwide web coverage and high speed web has aspired rapidly. Global cellular data service grew 74% and Fourth-Generation visitors exceeded Third-Generation site visitors for the first time in 2015.The carried out infrastructure cannot trade as lively to keep up with the fast-growing price of information application. The high demand for a awful composition capacity low free capacity and this outcomes in poor carrier pleasant and flux congestion .In a Long Term Evolution network which is governed by way division multiplexing these resources are evaluated as units in the time-frequency location and called as fortune units. This concept has proved to be very reliable for performance characterization.

2. HETEROGENEOUS NETWORK

First, we have to create a heterogeneous community in a Network Simulation platform. The Network is a Hexagonal region. In that hexagonal region, there are

many cells namely Small cells and adequacy accomplishment of as often as possible several watts. Macro cell execution can be raised by widening the ability of trans receiver. Full scale cell systems, with cell range 1-30km

3. **JOINT TRANSMISSION**

In the event that the Resource unit isn't adequate for clients implies we need to go for Joint Transmission i.e., to move one cell to another. Joint Transmission happens not just from the single system yet in addition from another system. The present point towards littler cells, an expanding number of clients of portable systems withstand at the top among two cells; these clients for the most part acknowledge poor assistance as an execution of nearly frail sign and solid obstruction. Correlative Multi-Point (COMP) with Joint Transmission (JT) is a versatile systems administration method permitting numerous Base Stations (BSs) to insinuate move to a solitary client. This support the clients' beneficiary conditions and flourishing better administration to cell-edge clients. We check a COMP-authorized arrange, encased of numerous BSs commonly subordinate by a media transmission organize. The phantom capacity of a solitary connection between transmitters also, a recipient is saved by the advantageous exchange power yet the complete otherworldly capacity can be helped by synchronous transmissions among numerous gadgets. This between client impedance and if not flawlessly made can corrupt the execution of the particular connection

3. LOAD CELL INTERFERENCE

At the point when we change User gadgets to another system would not joke about this make a contention. In our Project, we need to limit the impedance utilizing the Heterogeneous Network. Burden cell Impedance or Inter-Cell Interference (ICIC) technique, present an outcome by applying restrictions to the Radio Asset Management (RRM) square, improving steady transporter conditions across subsets of clients that are harshly stricken by the impedance, and in this manner come through high Ghostly Efficiency. This organized asset the executives can be accomplished through found, adaptable or constant coordination with the assistance of extra inter cell in which the flagging rate can shift likewise. In general, between cell flagging alludes to the correspondence bury.

5. **LOAD OPTIMATION**

For Load advancement Network Simulator (NS2) has been utilized. System reenactment is a method whereby an working framework speaks to the activity of a system by planning the communication between the diverse system

elements (switches, switches, hubs, passages, joins and so on.). Most test systems utilize discrete occasion recreation - the displaying of frameworks in which state factors change at discrete focuses in time. The conduct of the system and the different

Applications and administrations it supports can at that point be seen in a test lab; different properties of the condition can likewise be adjusted in a controlled way

to evaluate how the system/conventions would act under various conditions.

6**. CONCLUSION**

The venture has investigated how to advance cell-User Hardware blend with Joint Transmission for load coupled LTE HetNets. The cell load alludes to the volume of time-recurrence substance for serving client need, and the unit impacts each other's' heap levels because of common obstruction. Two streamlining issues, MinSumL and MinMaxL, have been planned and investigated. It moreover bolsters 5G organize and Under Water Wireless Correspondence Networks.

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PROCEEDING OF
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TITLE
Automatic billing system and Energy reading based on GSM Using PIC

 ISBN: 978-93-5406-440-1

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ABSTRACT:
An embedded system is a combination of software and hardware to perform a dedicated task. One of the most critical needs of an embedded system is to decrease power consumption and space. Some of the main devices used in embedded products are Microprocessors and Microcontrollers. Microprocessors are commonly referred to as general purpose processors as they simply accept the inputs, process it and give the output. These microprocessors contain no RAM, no ROM, and no I/O ports on the chip itself .For this reason, they are commonly referred to as general-purpose microprocessors. In contrast, a microcontroller has a CPU (microprocessor) in addition to a fixed amount of RAM, ROM, I/O ports, and a timer all are embedded together on one chip. A microcontroller not only accepts the data as inputs but also manipulates it, interfaces the data with various devices, controls the data and thus finally gives the result.

Automatic billing system and Energy reading based on GSM Using PIC

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Abstract-

An embedded system is a combination of software and hardware to perform a dedicated task. One of the most critical needs of an embedded system is to decrease power consumption and space. Some of the main devices used in embedded products are Microprocessors and Microcontrollers. Microprocessors are commonly referred to as general purpose processors as they simply accept the inputs, process it and give the output. These microprocessors contain no RAM, no ROM, and no I/O ports on the chip itself .For this reason, they are commonly referred to as general-purpose microprocessors. In contrast, a microcontroller has a CPU (microprocessor) in addition to a fixed amount of RAM, ROM, I/O ports, and a timer all are embedded together on one chip. A microcontroller not only accepts the data as inputs but also manipulates it, interfaces the data with various devices, controls the data and thus finally gives the result.

In today's world,the number of houses such as apartments and shops are increasing at a very higher rate.Consequently,readin g the electric amount of unit consumed at each promises also become difficulty.In the present day there is no scenario such that which will read the amount of units consumed automatically. The implementation of this paper will help in better energy management, conservation of energy and also in doing away with the unnecessary hassles over incorrect billing. The automated billing system will keep track

of the real time consumption and will leave little scope for disagreement on consumption and billing. The energy meter is an electrical measuring device, which is used to record Electrical Energy Consumed over a specified period of time in terms of units. The conventional electromechanical meters are being replaced by new electronic meters to improve accuracy in meter reading. Still, the Indian power sector faces a serious problem of lean revenue collection for the actual electric energy supplied owing to energy thefts and network losses.The GSM technology is used so that the consumer would receive messages about the consumption of power (in watts) and if it reaches the minimum

amount, it would automatically alert the consumer to recharge. This technology holds good for all electricity distribution companies, private communities, IT parks and self-containing housing projects.

LITERATURE REVIEW

Tanzim F. Aditi and et.al. (March 2010) proposed a Prepaid energy meters which have been widely adopted by utilities in different countries across the world as an innovative solution to the problem of affordability and consumption management. However, the present smart card based systems have some inherent problems like added cost, low availability and lack of security. In the future Smart Grid paradigm, use of smart meters can completely overhaul these prepaid systems by introducing centralized accounting, monitoring and credit-control functions using state-of-the-art telecommunication technologies like WiMAX. In this paper we pro-pose a prepaid smart metering scheme for Smart Grid application based on centralized authentication and charging using the WiMAX prepaid accounting model. We then discuss its specific application to Demand Response and Roam-ing of Electrical Vehicles.

Md. Rafiqul Islam Sheikh and et.al.(sep 2011) prposed a single phase digital prepaid energy meter based on two microcontrollers and a single phaseenergy meter IC. This digital prepaid energy meter does not have any rotating parts. The energy consumption is calculated usingthe output pulses of the energy meter chip and the internal counter of microcontroller. A microcontroller is used as a smart card and the numbers of units recharged by the consumers are written in it. A relay system has been used which either isolates or establishes the connection between the electrical load and energy meter through the supply mainsdepending upon the units present in the smart card.Energy consumption (kWh), maximum demand (kW), total unit recharged (kWh) and rest of the units (kWh) are stored in the ATmega32 to ensure the accurate measurement even in the event of anelectrical power outage that can be easily read from a 20×4 LCD. As soon as the supply is restored, energy meter restarts withthe stored values. A single phase prepaid energy meter prototype has been implemented to provide measurement up to 40A load current and 230V line to neutral voltage.Necessary program for microcontrollers are written in c-language and compiled byWin-AVR libc compiler.

EXISTING SYSTEM

In the present day scenario, the electric billing system is highly person dependent.It also has disadvantage that human errors cannot be avoided.Accessibility of meters in rural/agricultural zones is very difficult.Energy audits and calculating amount of electric unit consumed is performed based on bill collection which is highly inaccurate.Billing done mainly on estimated/monthly average basis.Inability to monitor and control discrete loads.billing cycle requires excessive time.

PROPOSED SYSTEM

The present power usage reading is made manually by moving to the consumer locations. This requires large number of labor operators and long working hours to accomplish the task. Manual billing is sometimes restricted and delayed by bad weather conditions. The printed billing also has the tendency of getting lost. Over the last few years, Smart (Prepaid) Energy Meter has been proposed as an innovative solution aimed at facilitating affordability and reducing the cost of utilities. This mechanism, essentially, requires the users to pay for the electricity before its consumption. In this way, consumers hold credit and then use the electricity until the credit is exhausted. If the available credit is exhausted then the electricity supply is cutoff by a relay.

The GSM infrastructure, which has national wide coverage, can be used to request and retrieve power consumption notification over individual houses and flats. Apart from making readings using GSM communication, billing system is needed to be made prepaid to avoid unnecessary usage of power. The use of Prepaid Energy meter is still controversial. On the one hand, those that support the diffusion of prepaid meters claim that they benefit both consumers and utilities because they help users to consume more efficiently and to improve the management of their budget, while allowing firms to reduce financial costs. On the other hand, those that are against prepaid meters argue that their adoption is expensive for firms and risky for low income consumers, as the insecurity and volatility of their income may force them to make little use of the service, or ultimately, bring about involuntary selfdisconnection.

BLOCK DIAGRAM OF

PROPOSED SYSTEM

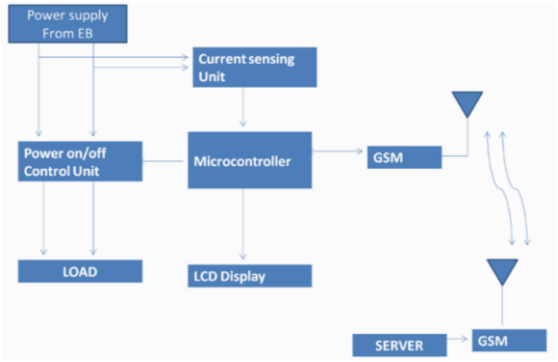


Fig 3.1 Block diagram of the proposed system

BLOCK DIAGRAM

DESCRIPTION

PIC 16F877A MICROCONTROLLER - PIC 16F877 is one of the most advanced microcontroller from Microchip. This controller is widely used for experimental and modern applications because of its low price, wide range of applications, high quality, and ease of availability. It is an 10bit microcontroller consists of channel A/D converter It is ideal for applications such as machine control applications, measurement devices, study purpose, and so on. The PIC 16F877 features all the components which modern microcontrollers normally have.

RELAY - It is an electrically operated switch.Here we use an electromagnetic relay driver.Insulation resistance-10,000 M ohm.it is shock and vibration resistive. A relay is an electrically controllable switch widely used in industrial controls, automobiles and appliances. The relay allows the isolation of two separate sections of a system with two different voltage sources.

CURRENT SENSOR - A **current sensor** is a device that detects electrical current (AC or DC) in a wire, and generates a signal proportional to it. The generated signal could be analog voltage or current or even digital output. It can be then utilized to display the measured current in an ammeter or can be stored for further analysis in a data acquisition system or can be utilized for control purpose.

MAX 232 - The MAX232 is an IC, first created in 1987 by Maxim Integrated Products, that converts signals from an RS-232 serial port to signals suitable for use in TTL compatible digital logic circuits. The MAX232 is a dual driver/receiver and typically converts the RX, TX, CTS and RTS signals.

GSM - A GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem. The main difference between them is that a dialup modem sends and receives data through a fixed telephone line while a wireless modem sends and receives data through radio waves.

LCD - Liquid Crystal Display screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. The reasons being: LCDs are economical; easily programmable; have no limitation.

CIRCUIT DIAGRAM OF PREPAID

ENERGY METER

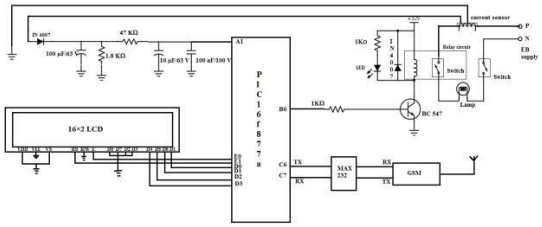


Fig 4.1 Circuit Diagram Of Prepaid Energy Meter

CIRCUIT FUNCTIONALITY

The Microcontroller PIC16F877A acts as the primary controller. The primary controller collects information from energy meter as well as from the smart card. Here, switches are used instead of the IC. Smart card, which is the switch, gives information about the limitation of units.

The energy meter reading is compared with the smart card information by the microcontroller. Depending upon the result, the microcontroller will activate the buzzer if the credit is low and the Controller will trigger the Relay if the credit goes very low. The relay is the switching device to cut off and restore power supply.

The LCD is interfaced to microcontroller using parallel port connection.

The microcontroller based system, continuously records the readings. The coding emphasizes the fact that it reduces human labour but increases the efficiency in calculation of bills for used electricity.The user can be notified about the low balance in their credit with the help of the GSM module.

The GSM modem is serially connected with the controller which is the major communication module between user and meter. The GSM uses its own network for the transfer of information. The programming makes use of messaging features of GSM AT command. And, once the relay is triggered, the electricity supply will be cut off. The power will be supplied again only if the meter is recharged with enough credit. **HARDWARE TOOLS**

PIC 16F877A ARCHITECTURE OVERVIEW

Microcontroller PIC16F877A is one of the PICMicro Family microcontroller which is popular at this moment, start from beginner until all professionals. Because very easy using

PIC16F877A and use FLASH memory technology so that can be write-erase until thousand times. The superiority this Risc Microcontroller compared to with other microcontroller 8-bit especially at a speed of and his code compression. PIC16F877A have 40 pin by 33 path of I/O.

PIC16F877A perfectly fits many uses, from automotive industries and controlling home appliances to industrial instruments, remote sensors, electrical doorlocks and safety devices. It is also ideal for smart cards as well as for

battery supplied devices because of its low consumption.EEPROM memory makes it easier to apply microcontrollers to devices where permanent storage of various parameters is needed (codes for transmitters, motor speed, receiver frequencies, etc.). Low cost, low consumption, easy handling and flexibility make PIC16F877A applicable even in areas where microcontrollers had not previously been considered (example: timer functions, interface replacement in larger systems, coprocessor applications, etc.).

In System Programmability of this chip (along with using only two pins in data transfer) makes possible the flexibility of a product, after assembling and testing have been completed. This capability can be used to create assemblyline production, to store calibration data available only after final testing, or it can be used to improve programs on finished products.

FEATURES OF PIC16F877A

- High performance RISC CPU.
- ONLY 35 simple word instructions.
- All single cycle instructions except for program branches which are two cycles.
- Operating speed: clock input (200MHz), instruction cycle (200nS).
- Up to 368×8bit of RAM (data memory), 256×8 of EEPROM (data memory), 8k×14 of flash memory.
- Pin out compatible to PIC 16C74B, PIC 16C76, PIC 16C77.
- Eight level deep hardware stack.
- Interrupt capability (up to 14 sources).
- Different types of addressing modes (direct, Indirect, relative addressing modes).
- Power on Reset (POR).
- Power-Up Timer (PWRT) and oscillator start-up timer.
- Low power- high speed CMOS flash/EEPROM.

Block Diagram of PIC 16F877A

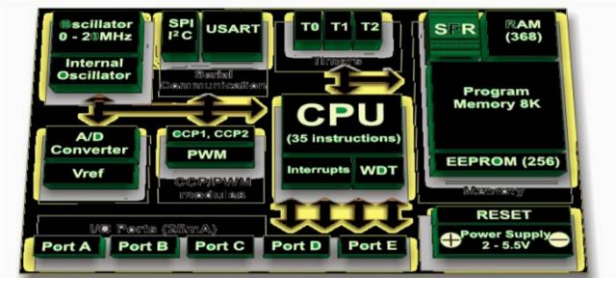


Fig 5.1 Block Diagram Of PIC 16F877A

T0CK1: Clock input to TIMER 0.

- T1OSO: Timer 1 oscillator output.
- T1OS1: Timer 1 oscillator input.
- T1CK1: Clock input to Timer 1.
- PGD: Serial programming data.
- PGC:Serial programming clock.
- PGM: Low Voltage Programming input.
- INT: External interrupt.
- RD: Read control for parallel slave port.
- CS: Select control for parallel slave.
- PSP0 to PSP7: Parallel slave port.
- VDD: Positive supply for logic and input pins.
- VSS: Ground reference for logic and input/output pins.

MAX 232

The MAX232 is an IC, first created in 1987 by Maxim Integrated Products, that converts signals from an RS-232 serial port to signals suitable for use in TTL compatible digital logic circuits. The MAX232 is a dual driver/receiver and typically converts the RX, TX, CTS and RTS signals.

The drivers provide RS-232 voltage level outputs (approx. ± 7.5 V) from a single + 5 V supply via on-chip charge pumps and external capacitors. This makes it useful for implementing RS-232 in devices that otherwise do not need any voltages outside the 0 V to + 5 V range, as power supplydesign does not need to be made more complicated just for driving the RS-232 in this case.

The receivers reduce RS-232 inputs (which may be as high as ± 25 V), to standard 5 V TTL levels. These receivers have a typical threshold of 1.3 V, and a typical hysteresis of

0.5 V.

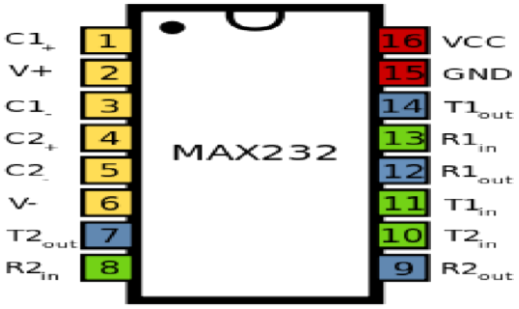


Fig 5.3 Pin Description of MAX 232

The MAX232 from Maxim was the first IC which in one package contains the necessary drivers (two) and receivers (also two), to adapt the RS-232 signal voltage levels to TTL logic. It became popular, because it just needs one voltage (+5V) and generates the necessary RS-232 voltage levels (approx. -10V and +10V) internally. This greatly simplified the design of circuitry. Circuitry designers no longer need to design and build a power supply with three voltages (e.g. -12V, +5V, and +12V), but could just provide one +5V power supply, e.g. with the help of a simple 78x05 voltage regulator.

The MAX232 has a successor, the MAX232A. The ICs are almost identical, however, the MAX232A is much more often used (and easier to get) than the original MAX232, and the MAX232A only needs external capacitors 1/10th the capacity of what the original MAX232 needs.

It should be noted that the MAX232(A) is just a driver/receiver. It does not generate the necessary RS-232 sequence of marks and spaces with the right timing, it does not decode the RS-232 signal, it does not provide a serial/parallel conversion. All it does is to convert signal voltage levels. Generating serial data with the right timing and decoding serial data has to be done by additional circuitry, e.g. by a 16550 UART or one of these small micro controllers (e.g. Atmel AVR, Microchip PIC) getting more and more popular.

The MAX232 are once rather expensive ICs, but today they are cheap. It has also helped that many companies now produce clones (ie. Sipex). These clones sometimes need different external circuitry, e.g. the capacities of the external capacitors vary. It is recommended to check the data sheet of the particular manufacturer of an IC instead of relying on Maxim's original data sheet.

RELAYs INTERFACE WITH THE PIC

MICROCONTROLLER

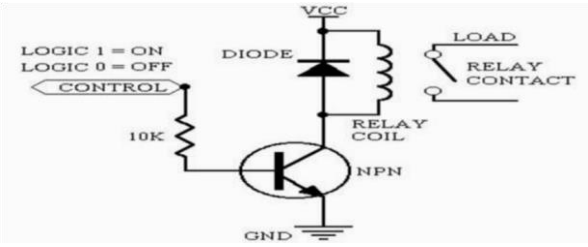


Fig 5.6 Relay Interfaces With The PIC Microcontroller

Fig 5.6 shows how to interface the Relay to microcontroller. There are 2 input channels. Each input is connected to the triggering coil of the respective relay. There are 2 output channels that each correspond to an input. When the input is energized, the relay turns on and the '+' output is connected to +12v. When the relay is off, the '+' output is connected to Ground.

CURRENT SENSOR

A **current sensor** is a device that detects electrical current (AC or DC) in a wire, and generates a signal proportional to it. The generated signal could be analog voltage or current or even digital output. It can be then utilized to display the measured current in an ammeter or can be stored for further analysis in a data acquisition system or can be utilized for control purpose.

The sensed current and the output signal can be:

- AC current input,
- Analog output, which duplicates the wave shape of the sensed current
- Bipolar output, which duplicates the wave shape of the sensed current
- Unipolar output, which is proportional to the average or RMS value of the sensed current
- DC current input,
- Unipolar, with a unipolar output, which duplicates the wave shape of the sensed current
- Digital output, which switches when the sensed current exceeds a certain threshold.

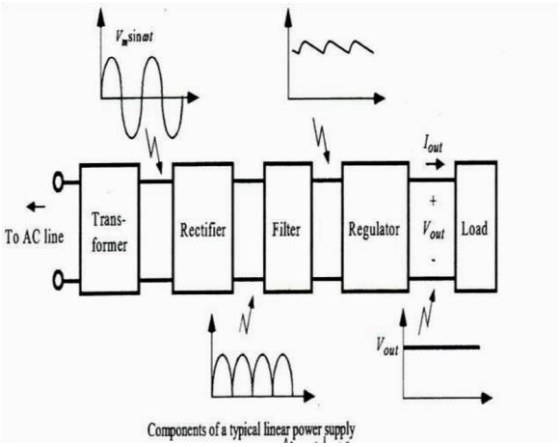
BASIC POWER SUPPLY CIRCUIT

Below is the circuit of a basic unregulated dc power supply. A bridge rectifier D1 to D4 rectifies the ac from the transformer secondary, which may also be a block rectifier such as WO4 or even four individual diodes such as 1N4004 types. (See later re rectifier ratings).

The principal advantage of a bridge rectifier is it does not need a centre tap on the secondary of the transformer. A further but significant advantage is that the ripple frequency at the output is twice the line frequency (i.e. 50 Hz or 60 Hz) and makes filtering somewhat easier.

BLOCK DIAGRAM OF POWER

SUPPLY



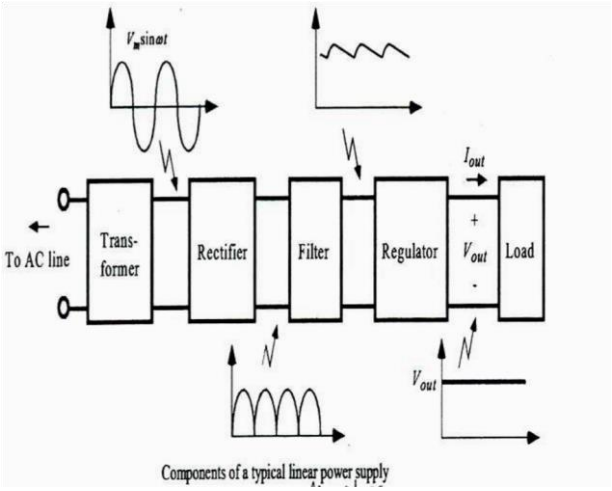


Fig 5.9 BlockDiagram of Power Supply

CIRCUIT DIAGRAM OF POWER

SUPPLY UNIT

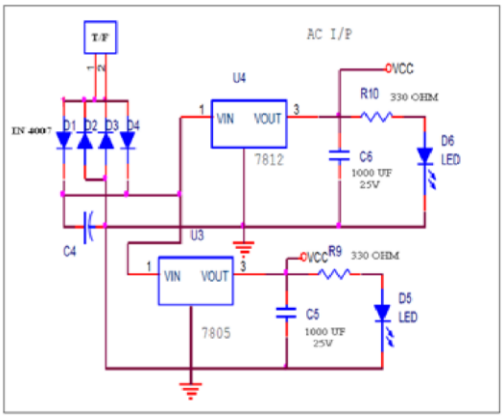


Fig 5.10 Circuit Diagram of Power Supply

GSM:

GSM (Global System for Mobile

Communications)is a standard developed by the European Telecommunications Standards Institute (ETSI) to describe protocols for second generation (2G) digital cellular networks used by mobile phones. It is the de facto global standard for mobile communications with over 90% market share, and is available in over 219 countries and territories.

The GSM standard was developed as a replacement for first generation (1G) analog cellular networks, and originally described a digital, circuit-switched network optimized for full duplex voice telephony. This was expanded over time to include data communications, first by circuit-switched transport, thenpacket data transport via GPRS (General Packet Radio Services) and EDGE (Enhanced Data rates for GSM Evolution or EGPRS).

Fig 5.14 GSM Modem

GSM MODEM

A GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem. The main difference between them is that a dialup modem sends and receives data through a fixed telephone line while a wireless modem sends and receives data through radio waves.A GSM modem can be an external device or a PC Card / PCMCIA Card.

Typically, an external GSM modem is connected to a computer through a serial cable or a USB cable. A GSM modem in the form of a PC Card / PCMCIA Card is designed for use with a laptop computer. It should be inserted into one of the PC Card / PCMCIA Card slots of a laptop computer. Like a GSM mobile phone, a GSM modem requires a SIM card from a wireless carrier in order to operate.

Both GSM modems and dial-up modems support a common set of standard AT commands. You can use a GSM modem just like a dial-up modem.

In addition to the standard AT commands, GSM modems support an extended set of AT commands. These extended AT commands are defined in the GSM standards. With the extended AT commands, you can do things like:

- Reading, writing and deleting SMS messages.

- Sending SMS messages.
- Monitoring the signal strength.
- Monitoring the charging status and charge level of the battery.
- Reading, writing and searching phone book entries.

SOFTWARE SELECTION

SOFTWARE TOOLS

Software's used in our project are

- Proteus Software
- Mikro pro compiler
- Pic c compiler

PROTEUS SOFTWARE

Proteus is a software technology that allows creating clinical executable decision support guidelines with little effort..

A software tool that allows creating and executing clinical decision support guidelines using the Proteus approach is available. Protean allows creating new

guidelines or editing existing ones very easily

GETTING STARTED WITH PROTEUS

- Click on Proteus ISIS and it will be appear as shown in image below. Right click the image and open in new tab to get a better look of the image. In the central area, we design our circuit i.e. place the components and then join them.
- Let's come to section 2, it has two buttons on it, one is P and other is E. P changes with the selection change of section 3 mostly it is used for opening the part list i.e component list and E is used for editing purposes, like you want to edit the properties of any component then simply click on that component and then click on E and it will open the properties of that component and you can easily edit it.
- Section 3 is most commonly used section of Proteus. It has a lot of functions on it. We will check them today one by one in complete detail.
- Now finally the section 4, this section shows different buttons like play, stop etc. When you design some circuit in Proteus, then you want to run it in order to check whether its working or not. So in order to run the circuit, you have

to click on this play button. So when you click on play button the circuit starts to run, now click on Pause button and it will pause and Stop to stop the circuit running.

- Now let's discuss the section 3, one by one. In the below image you can see the icon on which I have written Click # 1.When you click on this icon, your Proteus goes in the component state. We select components by clicking this icon. Suppose I want to use PIC16F877A in my circuit so what will I do, I will click on this Component Mode Icon and then Click on the P button and a new window will open up as shown in the below figure.
- In this new window there's a text box on which Keyword is written, this text box is used for the component search. Proteus database has unlimited components in it so now in order to get your desired component, you have to search for it as I did.
- I have search PIC16F877A and Proteus automatically show me that component as

  you can see below and not only the component name but also its preview in the top right corner and then the PCB preview as well. Unfortunately my Proteus doesn't have the PCB preview of PIC16F877A that's why it is showing blank.
- So after you are sure that you have selected the right component, either double click on it or click on the OK button as shown in figure below.
- If I just want to search one component then I will click OK but its not mostly the case as in circuit design, as we will see in our next classes, we have to add a lot of components so what we do is we simply search our component in text box and double click on it and then search the next component and so on.

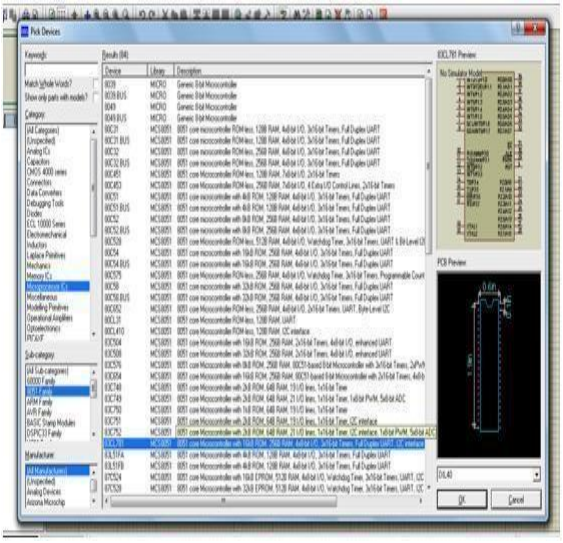


Fig 6.2 Proteus Databases

- Now move to next icon as shown in figure below. This is also another most commonly used icon in Proteus. As you can see when you click on it the white are shows few options. In circuit designing, there are lot of components which are getting with ground or power up, so if we are gonna add wires for each of them then it got quite messy.
- D has lots of functionality, it is used when we want to design our own component in proteus.
- E in the below figure is simply text section, like you want to add some text indication you use this one.

CIRCUIT DESIGNING IN PROTEUS:

- First of all, open the Proteus ISIS software.
- In the start, it will look exactly the same as in below image.
- Now click on button P as shown in below figure.

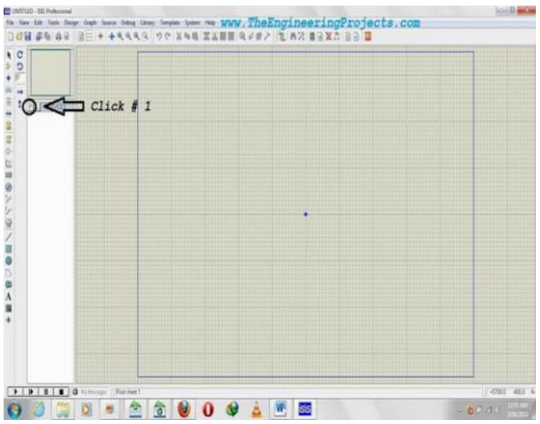


Fig 6.4 Circuit Designing In proteus

- When you click this button a NEW WINDOW will pop up as shown in below figure.
- This is the place where we search our components, like as I want 7805 so I searched for this component and

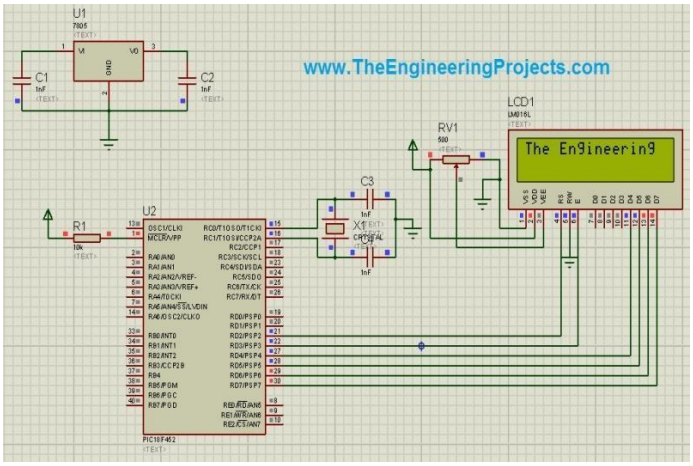


Fig 6.5 PIC With LCD-ISIS Professional

the Proteus has given me the related components.

- Once you get your desired component, simply double click on it and it will be added in your database so that you can use them.
- The below image shows the components which we are gonna use in this project, so simply search for all the components and then double click on them and finally you will get all the components as shown below:

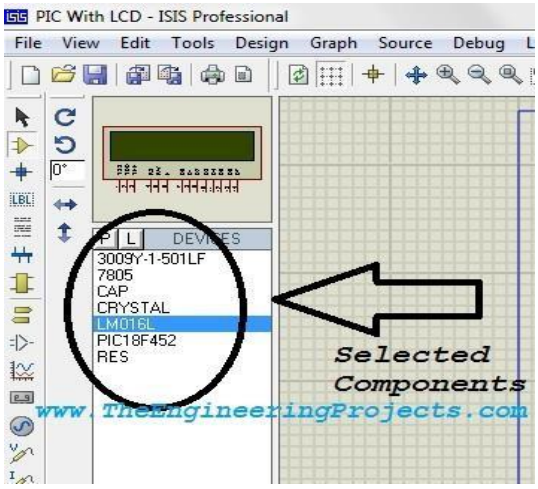


Fig **6.6 SCROLLING TEXT ON LCD WITH PIC IN PROTEUS**

of LCD with PIC on Proteus ISIS, which is also shown in the below figure:

- Now place these components in the Proteus workspace and connect them.
- Design exactly the same circuit as shown in the below figure:

SCROLLING TEXT ON LCD WITH PIC IN PROTEUS ISIS:

The circuit we are going to use is the same which we have used in the previous tutorial on Circuit Designing

- If you have the project which we designed in the previous tutorial then simply open it up or if you have deleted it, then create a NEW PROJECT in Mikro C Pro For PIC. Now built the project in MikroC Pro for PIC to get the hex file.

Upload this hex file in Proteus and hit RUN.

If everything's gone fine then you will see the text will start scrolling from left to right first and then from right to left, and it will keep on scrolling from one end to other as shown in below pics.

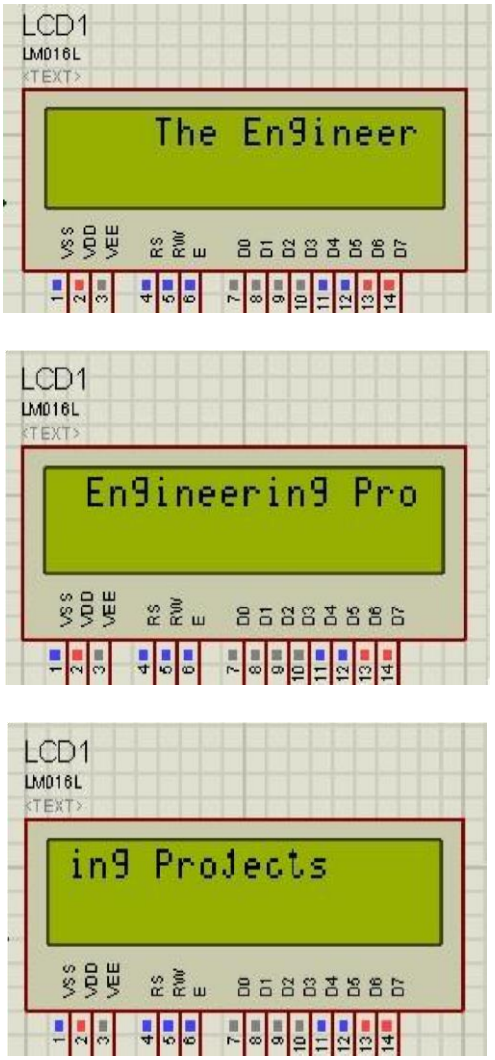


Fig 6.7 MIKRO Pro For PIC

- In the above set of images, I have shown step by step how the text is scrolling from right to left. In the same way, it will move from left to right.

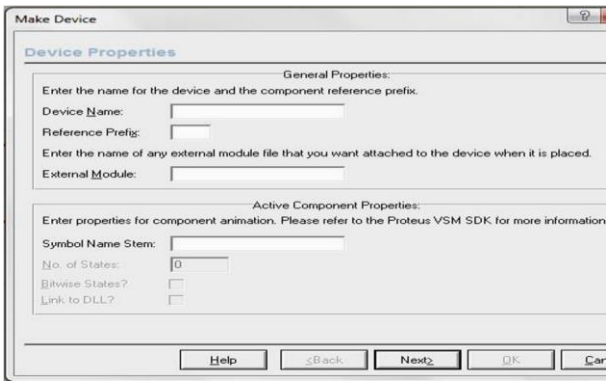


Fig 6.9 Properties of devices

To do auto routing, click on **Tools** and then **Auto Router** and a property box will open where you can set many different option for routing like the width of route and the PCB layers etc.

- After selecting your properties just click on **Begin Routing**

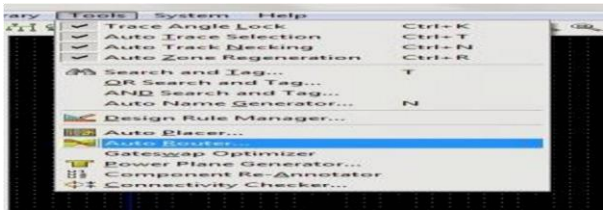


Fig 6.10 Auto Router

PCB will become ready after the process of auto routing as shown in below fig

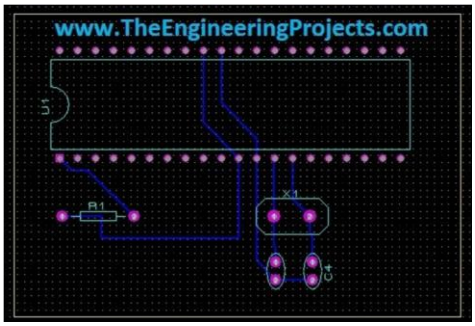


Fig 6.11 The designed circuit in ISIS

Proteus

MIKROC PRO

There are several C compilers on the market for the PIC18 series of microcontrollers. These compilers have many similar features, and they can all be used to develop C-based high-level programs for PIC18 microcontrollers. Some of the C compilers used most often in commercial, industrial, and educational PIC18

microcontroller applications are:

· MikroC

· PICC18

· C18

The popular and powerful MikroC, developed by MikroElektronika is easy to learn and comes with rich resources, such as a large number of library functions and an integrated development environment with a built-in simulator and an in-circuit debugger (e.g., mikroICD).

RESULT AND CONCLUSION

The Microcontroller PIC16F877A acts as the primary controller. The primary controller collects information from energy meter as well as from the smart card. Here, switches are used instead of the IC. Smart card, which is the switch, gives information about the limitation of units.

The energy meter reading is compared with the smart card information by the microcontroller. Depending upon the result, the microcontroller will activate the buzzer if the credit is low and the Controller will trigger the Relay if the credit goes very low. The relay is the switching device to cut off and restore power supply.

The LCD is interfaced to microcontroller using parallel port connection.

The microcontroller based system, continuously records the readings. The coding emphasizes the fact that it reduces human labour but increases the efficiency in calculation of bills for used electricity.The user can be notified about the low balance in their credit with the help of the GSM module.

The GSM modem is serially connected with the controller which is the major communication module between user and meter. The GSM uses its own network for the transfer of information. The programming makes use of messaging features of GSM AT command. And, once the relay is triggered, the electricity supply will be cut off. The power will be supplied again only if the meter is recharged with enough credit**.**

REFERENCE

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PROCEEDING OF

NATIONAL E-CONFERENCRE ON HARDWARESECURITY

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Paper Code
NCHS202003147

TITLE

RECURSIVE MULTIPLIER AND COMPARISON BETWEEN ARRAY, WALLACE AND DADDA MULTIPLIERS

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Second author: Reena Gladius. K , UG student , Jeppiaar Institute Of Technology
Third author: India. B. S, UG student, Jeppiaar Institute Of Technology

Fourth author: Dr. Uma. R*, Professor, Jeppiaar Institute Of Technology

ABSTRACT:
This mini project vividly aims in bringing out the comparison between different types of multipliers such as array multiplier, Wallace multiplier and dada multiplier. This comparison brings out the difference in power consumption, slice utilization, and combinational delay among the different multipliers .This has been practically simulated and implemented using XILINX SOFTWARE, Spartran 3E xc6slx4-3tqg144 and the hardware description language code is done in Verilog module. The main aim of the mini project is to compare the conventional multiplier with recursive multiplier and bring out the betterment in power efficiency ,reduced code length and reduced time delay for execution

RECURSIVE MULTIPLIER AND COMPARISON BETWEEN ARRAY, WALLACE AND DADDA MULTIPLIERS

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Abstract

This mini project vividly aims in bringing out the comparison between different types of multipliers such as array multiplier, Wallace multiplier and dada multiplier. This comparison brings out the difference in power consumption, slice utilization, and combinational delay among the different multipliers .This has been practically simulated and implemented using XILINX SOFTWARE, Spartran 3E xc6slx4-3tqg144 and the hardware description language code is done in Verilog module. The main aim of the mini project is to compare the conventional multiplier with recursive multiplier and bring out the betterment in power efficiency ,reduced code length and reduced time delay for execution

1.Introduction

A binary multiplier is an electronic circuit used in digital electronics such as computer ,to multiply two binary numbers .it is built using binary adders. A variety of computer arithmetic techniques can be used to implement a digital multiplier .Until the late 1970's most mini computers and early microprocessors did not have multiply instructions and so programmers use a multiplier routine .As more transistors became available due to very large scale integration it is possible to put the adders on a single chip to sum all the partial product, rather than reuse the single adder to handle each partial product one at a time.

There are different types of multipliers namely booth multiplier, sequential multiplier, array multiplier, combinational multiplier, Dadda multiplier,Wallace tree multiplier and so on .here in this mini project a detailed explanation about Array,Wallace and Dadda multipliers and a comparison is brought out based on the various parameters and show that recursive multiplier better power efficiency, reduced code length and reduced time delay. The main concept of recursive multiplier N/2 shift

II Various Multipliers

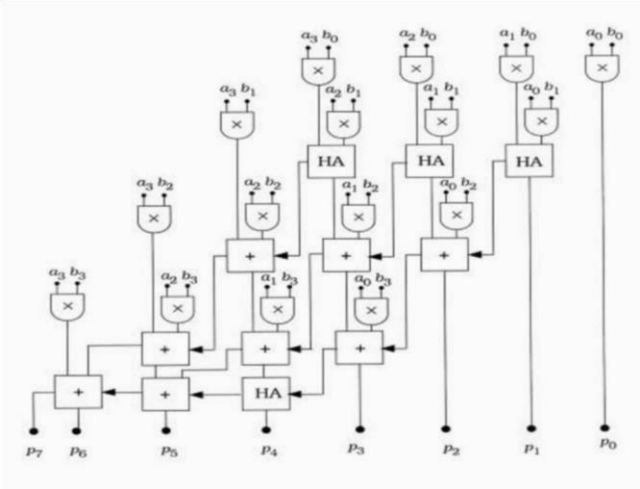
1.1Array multiplier

An array multiplier is a digital combinational circuit used for multiplying two binary numbers by employing an array of full adders half adders to form the various product terms an array of AND gates is used before the adder array. This is the fast way of multiplying two numbers since all it takes is the time for the signals to propagate through the gates that forms the multiplication array. let us consider two vector inputs a, b such that a[0],a[1],a[2],a[3] and b[0],b[1],b[2],b[3].m*n and m+n are the internal and external outputs where m is the multiplicant and n is the multiplier. Here, **the first set of product terms be** a[0]&b[0],a[1]&b[0] ,a[2]&b[0],a[3]&b[0],a[0]&b

1
[1],a[1]&b[1],a[2]&b[1],a[3]&b[1] and carry be c1, c2,c3,c4 shifted same as ripple carry adder. The partial

output be p[0],s1,s2,s3,s4. **The second set of products** be like a[0]&b[2],a[1]&b[2],a[2]&b[2],a[3]&b[2] and carry is c5,c6,c7,c8 .the partial output be like p[1],s5,s6,s7,s8. **The set of product** terms be like [0]&b[3],a[1]&b[3],a[2]&b[3],a[3]&b[3] and the carry is c9,c10,c11. The output be like p[2],p[3],p[4],p[5],p[6] and the final carry c12 is taken as p[7]

1.2Hardware implementation :



1.3. Hardware description language code:

```
module arraymul( output [7:0] p, input [3:0] x,
input [3:0] y ); wire [3:1] a; wire
[4:1] b; wire w1,w2,w3,c1,c2,c3,c4;
wire [4:1] e; wire f1,f2,f3,v1,v2,v3;
wire [4:1] d;  wire g1,g2,g3;  assign
p[0]=x[0]&y[0];                assign
a[1]=x[0]&y[1];                assign
a[2]=x[0]&y[2];                assign
a[3]=x[0]&y[3];                assign
b[1]=x[1]&y[0];                assign
b[2]=x[1]&y[1];                assign
b[3]=x[1]&y[2];                assign
b[4]=x[1]&y[3];          fa_dataflow
u1(p[1],c1,a[1],b[1],1'b0);
fa_dataflow u2(w1,c2,a[2],b[2],c1);
fa_dataflow u3(w2,c3,a[3],b[3],c2);
fa_dataflow
u4(w3,c4,1'b0,b[4],c3);          assign
d[1]=x[2]&y[0];                  assign
d[2]=x[2]&y[1];                  assign
d[3]=x[2]&y[2];                  assign
d[4]=x[2]&y[3];          fa_dataflow
u5(p[2],g1,d[1],w1,1'b0);
fa_dataflow   u6(v1,g2,d[2],w2,g1);
fa_dataflow   u7(v2,g3,d[3],w3,g2);
fa_dataflow   u8(v3,g4,c4,d[4],g3);
assign   e[1]=x[3]&y[0];         assign
e[2]=x[3]&y[1];                  assign
e[3]=x[3]&y[2];                  assign
e[4]=x[3]&y[3];          fa_dataflow
u9(p[3],f1,e[1],v1,1'b0);
fa_dataflow u10(p[4],f2,e[2],v2,f1);
fa_dataflow u11(p[5],f3,e[3],v3,f2);
fa_dataflow
u12(p[6],p[7],e[4],g4,f3);

endmodule
```

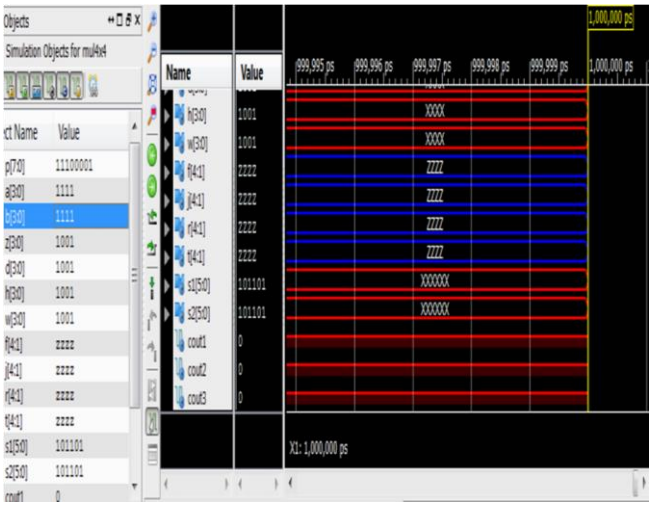


Fig 1. a: Simulation output of 4 bit array multiplier.

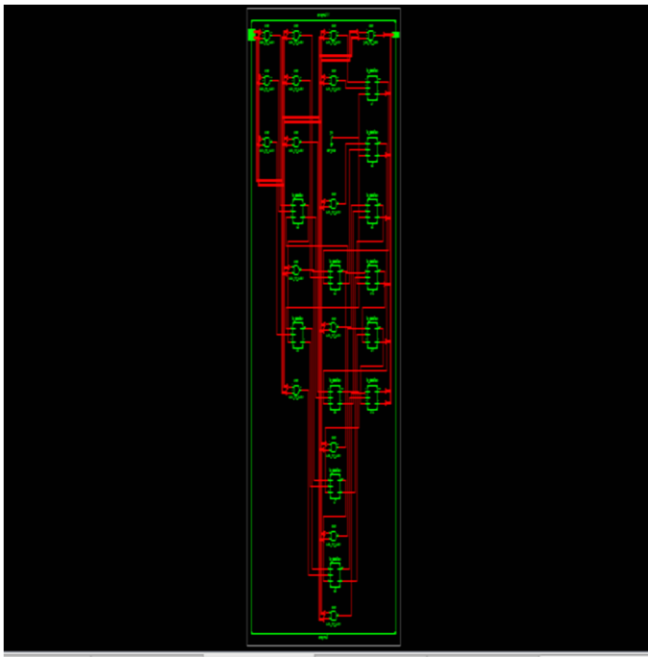


Fig 1.b : RTL view of 4 bit array multiplier.

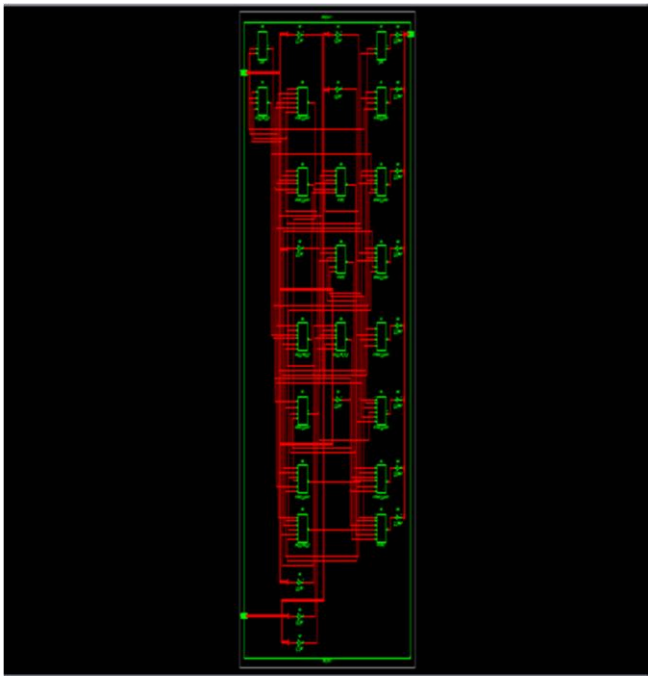


Fig1.c :Technological view of 4 bit array multiplier.

```
  Total number of paths / destination ports: 222 / 8
-------------------------------------------------------------------------
Delay:               8.267ns (Levels of Logic = 5)
  Source:            b<1> (PAD)
  Destination:       p<7> (PAD)

  Data Path: b<1> to p<7>
                                Gate     Net
    Cell:in->out      fanout   Delay   Delay  Logical Name (Net Name)
    ----------------------------------------  ------------
     IBUF:I->O             9   1.228   1.285  b_1_IBUF (b_1_IBUF)
     LUT6:I0->O            2   0.254   1.047  x7/Mxor_s_xo<0>1 (j<3>)
     LUT5:I0->O            3   0.254   0.651  x23/cout1 (u<3>)
     LUT4:I3->O            1   0.254   0.579  x24/Mxor_s_xo<0>1 (p_5_OBUF)
     OBUF:I->O                 2.715          p_5_OBUF (p<5>)
    ----------------------------------------
    Total                      8.267ns (4.705ns logic, 3.562ns route)
                                       (56.9% logic, 43.1% route)

-------------------------------------------------------------------------
```

Fig 1.d: Timing report of 4 bit array multiplier.

2.1Wallace multiplier:

The Wallace multiplier is an efficient hardware implementation of a digital circuit that multiplies two integers. The benefit of Wallace multiplier is that there are only 0(log n) reduction layer and each layer has 0(1) propagation delay. The partial product is 0(1) and the final addition is log(n). The power delay product are performed for 4 bit Wallace multiplier in 180nm CMOS technology.The power and delay of the multiplier are 689.3 micro watt and 50 micro seconds. Let us consider two vectored inputs a, b as a[0],a[1],a[2],a[3] and b[0],b[1],b[2],b[3].the final vector products be like p[0] to p[7].

Here,**The first set of products:**

a[0]&b[0],a[1]&b[0],a[2]&b[0],a[3]&b[0];a[0]&
b[1],a[1]&b[1],a[2]&b[1],a[3]&b[1];a[0]&b[2],a[

1]&b[2],a[2]&b[2],a[3]&b[2]

The second set of products :s1, s2, s3

,s4,a[3]&b[2],c1,c2,c3,c4,a[0]&b[3],a[1]&b[3],a[

2]&b[3],a[3]&b[3]

The third set of products

:S5,S6,S7,S8,A[3]&B[3],C5,C6,C7,C8 and are added using ripple carry adder and the carry are forwarded to the next stage as c9,c10,c11The final product terms are p[0] to p[7].Here the final product p[7] is the final carry of the ripple carry

adder c12

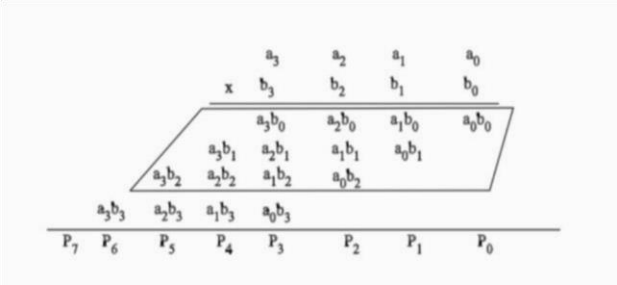
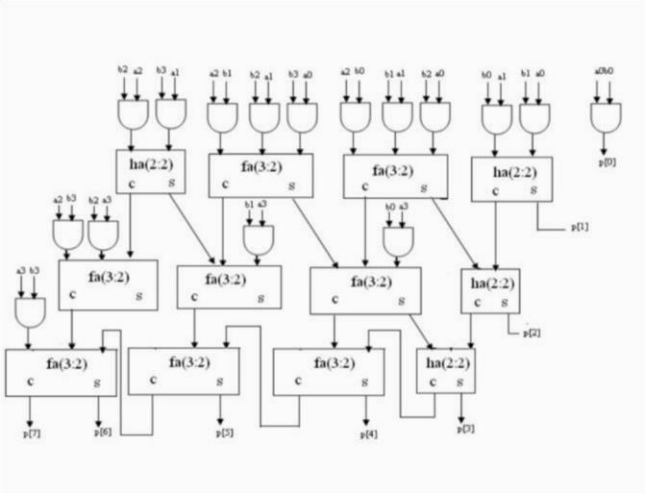


Fig 2.a: Mathematical representation of Wallace multiplier

Hardware implementation:



.

Hardware description language code:

```
module wallacemul( output [7:0] p, input [3:0] a,

input [3:0] b ); wire [15:0]
pp; wire

s2,s3,s4,c1,c2,c3,c4,ss2,ss3,ss4,cc1,cc2,cc3,cc4,c
cc1,ccc2,ccc3,ccc4; assign p[0]=a[0]&b[0]; assign
pp[1]=a[0]&b[1]; assign pp[2]=a[0]&b[2]; assign
pp[3]=a[0]&b[3]; assign pp[4]=a[1]&b[0]; assign
pp[5]=a[1]&b[1]; assign pp[6]=a[1]&b[2]; assign
pp[7]=a[1]&b[3]; assign pp[8]=a[2]&b[0]; assign
pp[9]=a[2]&b[1]; assign pp[10]=a[2]&b[2]; assign
pp[11]=a[2]&b[3]; assign pp[12]=a[3]&b[0]; assign
pp[13]=a[3]&b[1]; assign pp[14]=a[3]&b[2]; assign
pp[15]=a[3]&b[3]; ha u1 (p[1],c1,pp[1],pp[4]); fa_struct
u2(s2,c2,pp[2],pp[5],pp[8]); fa_struct
u3(s3,c3,pp[3],pp[6],pp[9]); ha u4(s4,c4,pp[7],pp[10]);
ha u5(p[2],cc1,s2,c1); fa_struct u6(ss2,cc2,s3,c2,pp[12]);
fa_struct u7(ss3,cc3,s4,c3,pp[13]); fa_struct
u8(ss4,cc4,pp[11],c4,pp[14]); ha u9(p[3],ccc1,ss2,cc1);
fa_struct u10(p[4],ccc2,ss3,cc2,ccc1); fa_struct
u11(p[5],ccc3,ss4,cc3,ccc2); fa_struct
u12(p[6],p[7],cc4,pp[15],ccc3);

endmodule
```

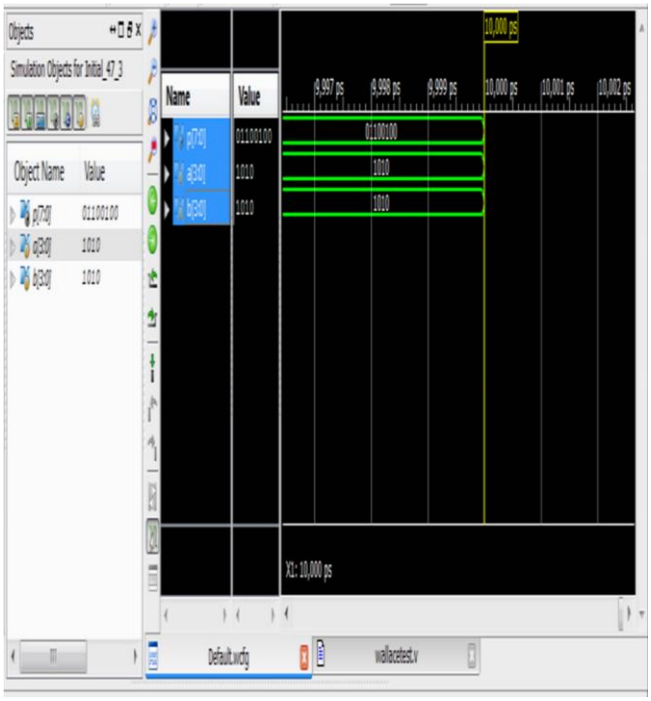


Fig 2.b: simulated output of Wallace multiplier.

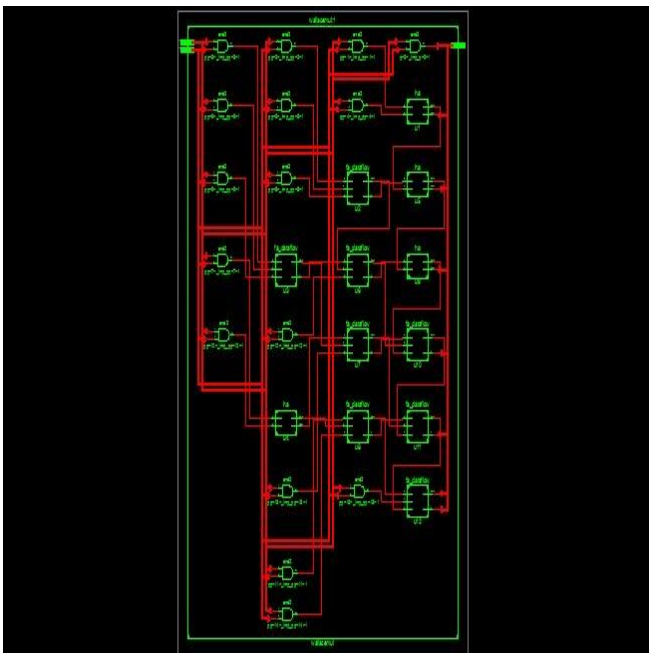


Fig 2.c: RTL view of Wallace multiplier.

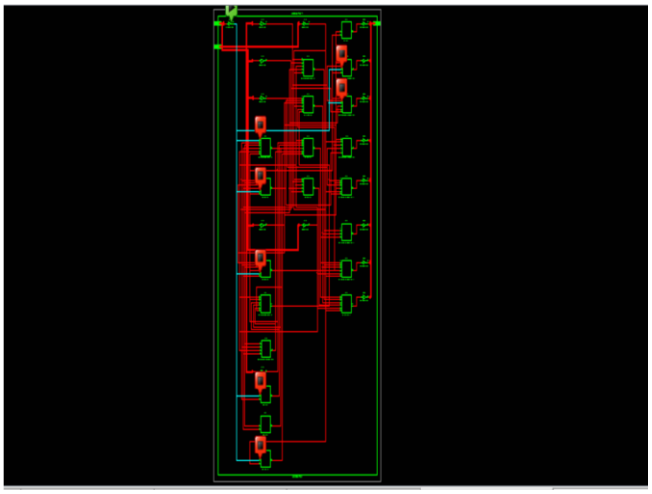


Fig 2.d:Technological view of Wallace multiplier

```
Delay:               9.623ns (Levels of Logic = 6)
  Source:            a<1> (PAD)
  Destination:       p<7> (PAD)

  Data Path: a<1> to p<7>
                                Gate     Net
    Cell:in->out      fanout   Delay   Delay  Logical Name (Net Name)
    ----------------------------------------  ------------
     IBUF:I->O             9   1.228   1.106  a_1_IBUF (a_1_IBUF)
     LUT4:I0->O            2   0.254   1.047  u4/Mxor_sum_xo<0>1 (s4)
     LUT6:I1->O            2   0.254   1.072  u7/Mxor_s_xo<0>1 (ss3)
     LUT6:I0->O            3   0.254   0.879  u10/carry1 (ccc2)
     LUT6:I3->O            1   0.235   0.579  u12/carry1 (p_7_OBUF)
     OBUF:I->O                 2.715          p_7_OBUF (p<7>)
    ----------------------------------------
    Total                      9.623ns (4.940ns logic, 4.683ns route)
                                       (51.3% logic, 48.7% route)
```

Fig 2.e: Timing report of Wallace multiplier.

3.Dadda multiplier:

Dadda multiplier is a hardware multiplier that is similar to Wallace multiplier but it is slightly faster and requires fewer gates.dadda multipliers attempt to minimize the number of gates and input/output delay.dad da multipliers have a less expensive reduction phase but the final numbers may be a few bits longer and thus requires slightly big adders.Let us consider two vector inputs a,b such that a[0] to a[3] and b[0] to b[3].the partial products are obtained by grouping in 3.the final vector products are p[0] to p[7] and the carry be c1 to c14

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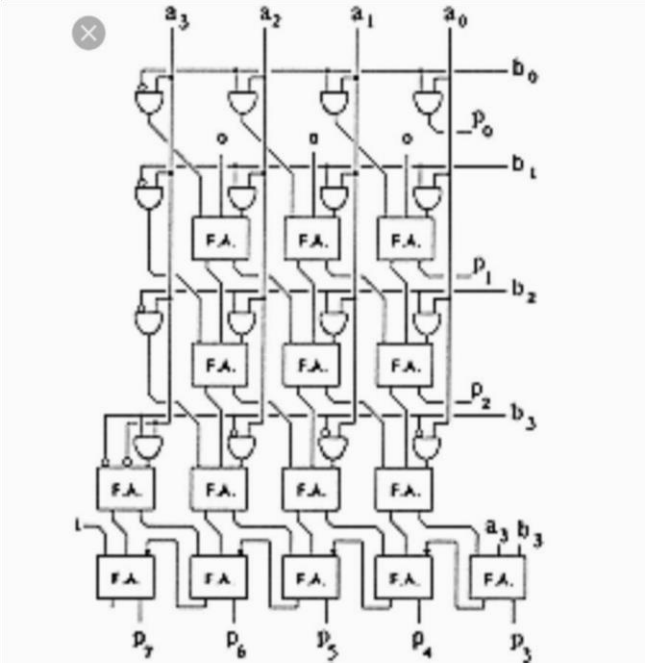

Fig 3.a: Hardware implementation of dadda multiplier

Hardware description language code:

```
moduledadamul( output [7:0] p, input [3:0] a,
input [3:0] b
 );
wire
x0,x1,x2,x3,x4,x5,x6,x7,x8,x9,x10,x11,x12,x13,x
14 ,x15,c1,c2,c3,c4,c5,c6,c7,c8,c9,c10,c11,c12,c 1
3,c14,s1,s2,s3,s4,s5,s6,s7,s8,s9,s10; assign
p[0]=a[0]&b[0]; assign x1=a[1]&b[0]; assign
x2=a[0]&b[1]; assign x3=a[0]&b[2]; assign x4=a[1]&b[1];
assign x5=a[2]&b[0];
assign x6=a[2]&b[1]; assign x7=a[1]&b[2];
assign x8=a[0]&b[3]; assign x9=a[3]&b[1];
assign x10=a[2]&b[2]; assign x11=a[1]&b[3];
assign x12=a[3]&b[0]; assign x13=a[3]&b[2];
assign x14=a[2]&b[3]; assign x15=a[3]&b[3];
fa_dataflowz1(p[1],c1,x1,x2,1'b0);
fa_dataflowz2(s2,c2,x3,x4,x5);
fa_dataflowz3(p[2],c6,c1,s2,1'b0);
fa_dataflowz4(s3,c3,x6,x7,x8);
fa_dataflowz5(p[3],c11,s7,c6,1'b0);
fa_dataflowz6(s4,c4,x9,x10,x11);
fa_dataflowz7(p[4],c12,c7,s8,c11);
fa_dataflowz8(s7,c7,c2,s3,x14);
fa_dataflowz9(s8,c8,c3,s4,1'b0);
fa_dataflowz10(s5,c5,x12,x13,1'b0);
fa_dataflowz11(s9,c9,s5,c4,1'b0);
fa_dataflowz12(p[5],c13,s9,c8,c12);
fa_dataflowz13(s10,c10,x15,c5,1'b0);
fa_dataflowz14(p[6],c14,c9,c13,s10);
fa_dataflowz15(p[7],wa,c10,c14,1'b0);
endmodule
```

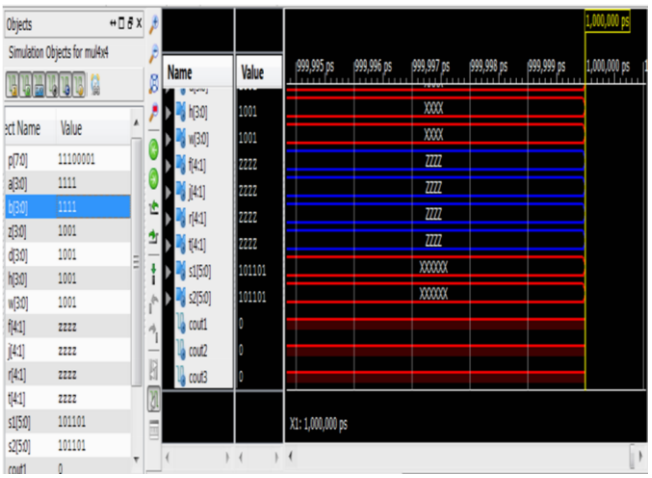

Fig 3.b:Simulation output of dadda multiplier

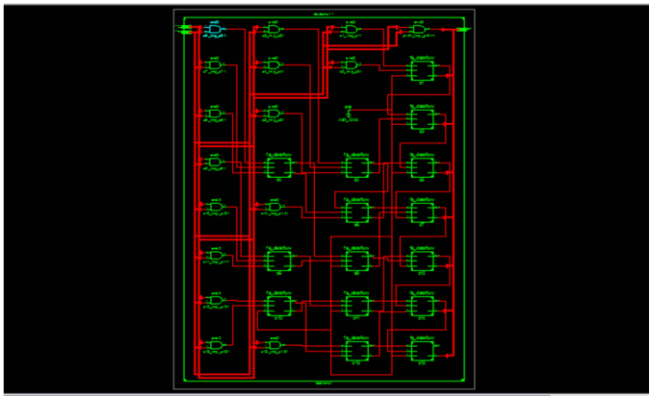

Fig 3.c: RTL view of dadda multiplier

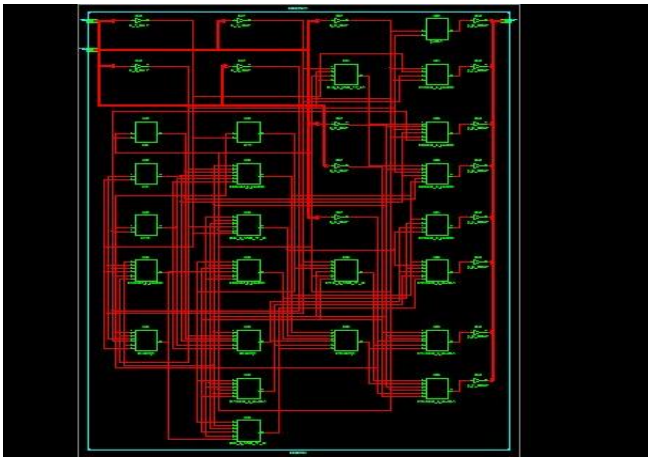

Fig 3.d:T echnological view of dadda multiplier

```
Timing constraint: Default path analysis
  Total number of paths / destination ports: 303 / 8
--------------------------------------------------------------------------------
Delay:               10.118ns (Levels of Logic = 6)
  Source:            b<2> (PAD)
  Destination:       p<6> (PAD)

  Data Path: b<2> to p<6>
                              Gate     Net
    Cell:in->out      fanout   Delay   Delay  Logical Name (Net Name)
    ----------------------------------------  ------------
     IBUF:I->O             13   1.228   1.363  b_2_IBUF (b_2_IBUF)
     LUT6:I1->O             2   0.254   1.072  z4/carry1 (c3)
     LUT6:I0->O             2   0.254   1.072  z9/a_b_AND_17_o1 (c8)
     LUT6:I0->O             2   0.254   1.072  z12/carry1 (c13)
     LUT6:I0->O             1   0.254   0.579  z14/Mxor_s_xo<0>1 (p_6_OBUF)
     OBUF:I->O                  2.715          p_6_OBUF (p<6>)
    ----------------------------------------
    Total                     10.118ns (4.959ns logic, 5.159ns route)
```

Fig3.e:Timing report of dadda multiplier

Hardaware description language:

4.Recursive multiplier:

For high speed multiplier implementation the recursive architecture is a parallel and moduler approach with low complexity when array multiplier it requires more area due to inertconnection between sub modules.Accordsing to experimental result progation delay is reduced by 20.5% and 40.9%Without affecting the speed both power consumption are further reduced by

25%approximately.In recursive multiplier we use4 4x4 mux,2 6-bit full adder and 1 8-fulladder.

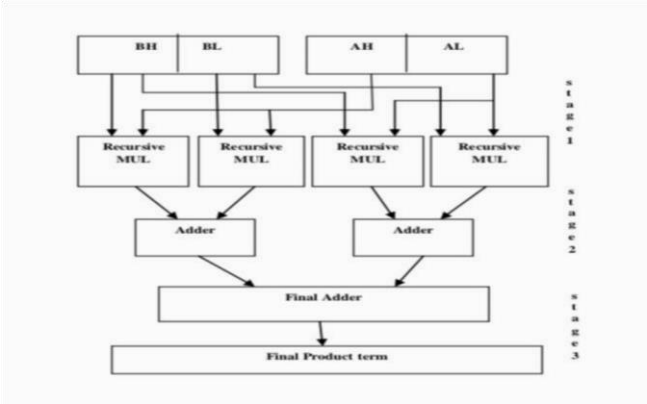

Fig 4.a: Recursive architecture.

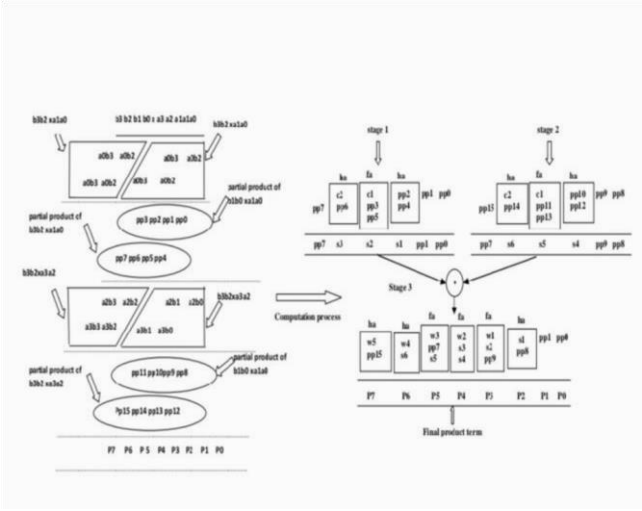

fig 4.b : mat hematical representation of recursive multiplier

I)Multiplexer 2*2

```
module mul2x2(output [3:0] p,input [1:0] a,input
[1:0] b); wire [3:0] y; wire
s1,c1,s2,c2; assign
y[0]=a[0]&b[0]; assign
y[1]=a[1]&b[0]; assign
y[2]=a[0]&b[1]; assign
y[3]=a[1]&b[1]; assign
p[0]=y[0]; assign s1=y[1]^y[2];
assign c1=y[1]&y[2]; assign
p[1]=s1; assign s2=c1^y[3];
assign c2=c1&y[3]; assign
p[2]=s2; assign p[3]=c2;
endmodule
```

II)adder 6:

```
module adder6 (output [5:0] s,input cout,input [5:0]
a,input [5:0] b,input c); wire [4:0] d; fa_dataflow
x1(s[0],d[0],a[0],b[0],c); fa_dataflow
x2(s[1],d[1],a[1],b[1],d[0]); fa_dataflow
x3(s[2],d[2],a[2],b[2],d[1]); fa_dataflow
x4(s[3],d[3],a[3],b[3],d[2]); fa_dataflow
x5(s[4],d[4],a[4],b[4],d[3]);

fa_dataflow x6(s[5],cout,a[5],b[5],d[4]);

endmodule
```

III)adder 8:

```
module adder8(output [7:0] s,output cout,input
[7:0] a,input [7:0] b,input c); wire [6:0] d;

fa x1(s[0],d[0],a[0],b[0],c); fa
x2(s[1],d[1],a[1],b[1],d[0]); fa
x3(s[2],d[2],a[2],b[2],d[1]); fa
x4(s[3],d[3],a[3],b[3],d[2]); fa
x5(s[4],d[4],a[4],b[4],d[3]); fa
x6(s[5],d[5],a[5],b[5],d[4]); fa
x7(s[6],d[6],a[6],b[6],d[5]); fa
x8(s[7],cout,a[7],b[7],d[6]);
endmodule
```

Recursive multiplier: module mul4x4(output [7:0] p,input [3:0] a,input

[3:0] b); wire [3:0] z,d,h,w; wire [4:1] f,j,r,t; wire [5:0] s1,s2; wire cout1,cout2,cout3; mul2x2 x1(z,b[1:0],a[1:0]); mul2x2 x2(d,b[1:0],a[3:2]); mul2x2 x3(h,b[3:2],a[1:0]); mul2x2 x4(w,b[3:2],a[3:2]); adder6 x5(s1,cout1,{2'b00,z},{d,2'b00},1'b0); adder6 x6(s2,cout2,{2'b00,h},{w,2'b00},1'b0); adder8 x7(p,cout3,{2'b00,s1},{s2,2'b00},1'b0);

endmodule

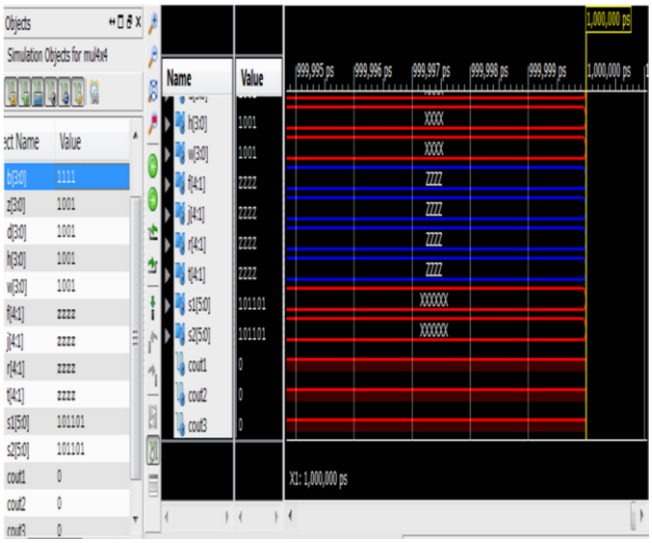

Fig 4.c: simulated output of recursive multiplier.

Fig 4.d: RTL view of recursive multiplier.

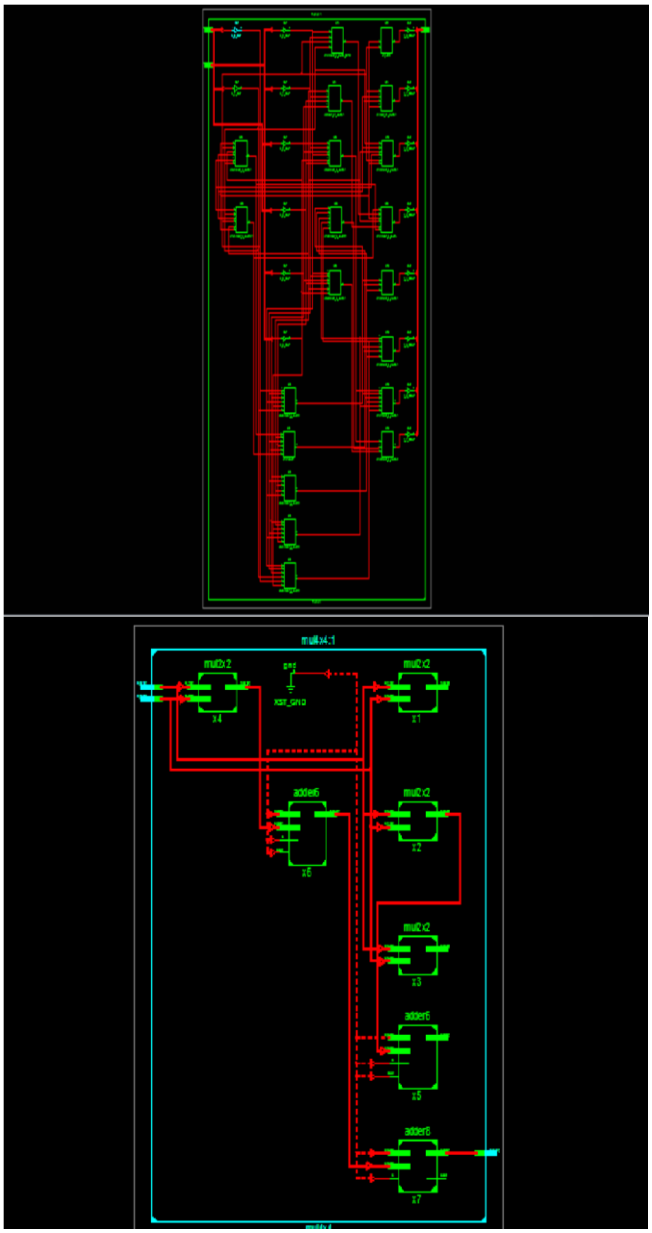

Fig 4.f:Timing report of 4*4 recursive multiplier.

Comparison:

```
Delay:              9.495ns (Levels of Logic = 6)
  Source:           a<0> (PAD)
  Destination:      p<7> (PAD)

  Data Path: a<0> to p<7>
                                Gate     Net
    Cell:in->out      fanout    Delay    Delay  Logical Name (Net Name)
    ----------------------------------------  ------------
     IBUF:I->O             14   1.228    1.413  a_0_IBUF (a_0_IBUF)
     LUT6:I0->O             2   0.254    1.072  x7/x4/Mxor_s_xo<0>41 (N36)
     LUT6:I0->O             4   0.254    0.792  x7/x4/cout1 (x7/d<3>)
     LUT5:I3->O             1   0.250    0.688  x7/x8/Mxor_s_xo<0>11 (N01)
     LUT3:I1->O             1   0.250    0.579  x7/x8/Mxor_s_xo<0>2 (p_7_OBUF)
     OBUF:I->O                  2.715           p_7_OBUF (p<7>)
    ----------------------------------------
    Total                      9.495ns (4.951ns logic, 4.544ns route)
                                       (52.1% logic, 47.9% route)

--------------------------------------------------------------------------------
```

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Fig 4.e: Technological view of recursive multiplier.

Multiplier type	Slice optimization	Combinational delay
Array	19 out of 2400	8.267
Wallace	20 out of 2400	9.623ns
Dadda	21 out of 2400	10.11ns
Recursive	20 out of 2400	9.495ns

III CONCLUSION:

Thus in this project the difference in power efficiency , code length and time delay of different multipliers have been studied and comparison is brought out.above all the timing report shows that recursive multiplier performs more efficiently than array,waalace,dadda multiplier.the simulated output, the RTL view and technological view establishes the implemented output.

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TITLE
PROPER CONDITION AND STABILIY OF BRIDGE IS MONITORED USING RASBERRY PI PROCESSOR

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ABSTRACT:
Advancements in sensor technology have brought the automated real-time bridge health monitoring system. Many long span bridges in Korea and in Japan have adopted this real-time health monitoring system. However, current system uses complicated and high cost wired network amongst sensors in the bridge and high cost optical cable between the bridge and the management center, which increases the overall cost of installation and maintenance cost of health monitoring system. The complicated wiring also makes the installation and repair/replacement process difficult and expensive. In this paper we suggest new idea of monitoring the bridge for safety road travel by using raspberry pi with some of the sensor. The processor intimate condition of bridge to control room using GSM if the bridge is not able to bear the weight or any other problem,. Sensor technologies have made the monitoring process more Accurate and fast. GSM is suggested to send the data to the remote maintenance location in which the maintenance office is located

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Index Terms- Sensors, GSM (Global System for Mobile communication), Bridge Monitoring System, Rasberry Pi.

1. Introduction: Civil infrastructure systems such as brides, buildings, pipelines, and offshore structures are

valuable national assets that must be maintained to ensure public safety. In a modern society, these structures facilitate our transportation networks, industrial activities, and everyday life. The annual expenditure of the United States on transportation infrastructure was $66.7 billion in 2004 (Orszag, 2008). Currently, much of this infrastructure is reaching its design life and will need to be replaced or retrofitted to remain in service. Bridge structures are one class of civil infrastructure that is particularly problematic. More than 148,000 bridges, mostly short and medium sizes, are structurally deficient or functionally obsolete, according to the 2009 report from the Federal Highway Administration (FHWA, 2009).One notable and highly publicized bridge from this list was the I-35W Bridge in Minnesota. The bridge had been given a “structurally deficient” rating from the federal government since 1990 due to

severe corrosion in its bearings. This bridge collapsed in 2007, due to under-designed gusset plates. Indeed, a 2001 report from the Minnesota DOT (MnDOT, 2001) instrumentation of this bridge using strain gages and a continuous SHM system to monitor some of the fracture critical members. Continuous evaluation of structural condition and timelymaintenance of infrastructure might have offered the opportunity to prevent this catastrophic

Collapse.

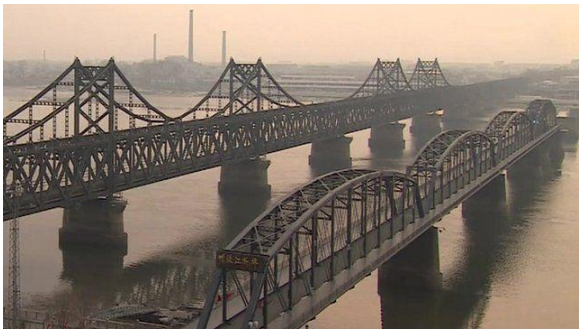

Fig 1.1 Bridge in China

2. LITERATURE SURVEY:

As per with the help of the wireless technology many problems due to data cables and expensive optical cables are now minimized and eliminated. Sensor and Zigbee module becomes u-mode ubiquitous node).Zigbee is provided to be excellent solution in short distance wireless data communication. For long distance. [1]

A multifunctional wireless bridge monitoring system has been developed for concurrent accerlometer.strain transducer and temperature sensors. The hybrid sensing capabilities of these nodes satisfies the immediate requirement for economic, low mataience load ratings and short term measurements in addition to providing the hardware functionality for long term continuous bridge monitoring system [2].

Bridge monitoring system is significant to health diagnosis of bridges and flyovers. This report is proposed and developed a novel architecture for large span bridge monitoring. A 3-level distributed structure is adopted in the monitoring system, which includes central server, intelligent acquisition node and local controller.[3]

3. PROJECT OBJECTIVES:

- Design of Bridge monitoring system
- Analysis of bends, cracks and load are done
- Implementation of different sensor detects the vehicles that enter the bridge keep count number of vehicles on the bridge

4.BLOCK DIAGRAM:

The sensors are installed on various parts of the bridge as shown in the above system block diagram, monitors the bend, traffic, weight of the vehicles etc. At any point of time if any of these parameters cross their threshold value the communication system informs the management center giving an alarm for taking precautionary measures. The complete parameters of the bridge are taken by Raspberry pi and sent to another

module which is located in a short distance.

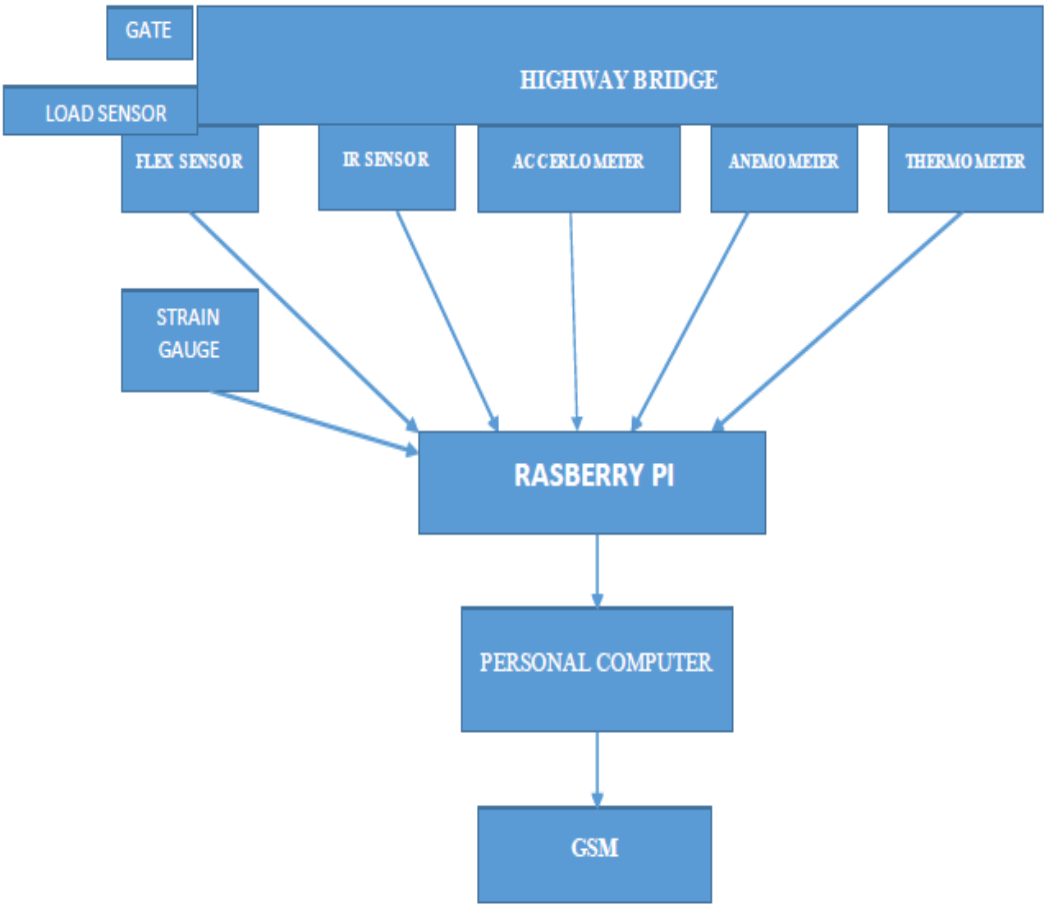

Fig 1.2 Block Diagram

4.1 ACCERLOMETER SENSOR

Accelerometer sensor can measure static(earth gravity)or dynamic acceralation in all three axis, it is used to measure acceralation/ deceleration of object like car or robot

4.2 FLEX SENSOR:

A **flex sensor** or **bend sensor** is a sensor that measures the amount of deflection or bending. Usually, the sensor is stuck to the surface, and resistance of sensor element is varied by bending the surface. Since the resistance is directly proportional to the amount of bend it is used as goniometer, and often called flexible potentiometer

4.3 ANEOMETER SENSOR:

An **anemometer** is a device used for measuring wind speed, and is also a common weather station instrument. The term is derived from the Greek word *anemos*, which means wind, and is used to describe any wind speed instrument used in meteorology.

4.4 RASPBERRY PI:

The **Raspberry Pi** is a series of small single-board computers developed in the United Kingdom by the Raspberry Pi Foundationto promote teaching of basic computer science in schools and in developing countries. The original model became far more popular than anticipated, selling outside its target market for uses such as robotics. It does not include peripherals (such as keyboards and mice) and cases. However, some accessories have been included in several official and unofficial bundles.

Fig 1.3 Rasberry PI

4.5LOAD SENSOR

A load cell is a "load transducer" which converts the weight or load acting on it into electrical signals. A load cell is composed of an aluminum alloy spring element, strain gauges (serving as sensors) and a bridge circuit. The strain gauges themselves are bonded onto four areas, which become considerably distorted in the spring element. The load cell detects the force of the distortion as voltage change**.**

4.5 GSM MODULE:

The GSM Modem comes with a serial interface through which the modem can be controlled using AT command interface. An antenna and a power adapter are provided. The basic segregation of working of the modem is as under:

- Voice calls
- SMS
- GSM Data calls
- GPRS

5.SOFTWARE DEVELOPMENT CYCLE

When you use the Keil µVision3, the project development cycle is roughly the same as it is for any other software development project.

- Create a project, select the target chip from the device database, and configure the tool settings. Create source files in C or assembly. Correct errors in source files.
- Test the linked application.
- The following block diagram illustrates the complete µVision3 software development cycle
-

6. RESULTS AND DISCUSSIONS:

The accelerometer, thermometer, strain gauge & anemometer are the sensors which sense bridge conditions these are interface using PIC microcontrollerIf there is any changes of bridge parameters sensors sense it & send information to control room by using GSM network which is mobile network .It is also display these parameters on the LCD.

Fig 1.4 Result

7.CONCLUSION:

- This system helps to monitor the bridge condition by using sensor, process the data by raspberry pi
- and send the information to control room using wireless network.
- Web Camera has been installed to find the density of the vehicle can be known who enter the bridge using matlab

- It can be used in different application like
- Finding ambient Temperature
- Bend that bridge undergo
- If there is any tilt in the bridge is found
- Can count the number of vehicles and weigh vehicle

7.1FUTURE WORK:

The information are send using GSM we can send information using IOT

The data can be deliver accurate and fast

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TITLE
ASSESSMENT OF POSITIVE AND NEGATIVE STATES OF CHILDREN WITH AUTISM SPECTRUM DISORDER USING ELECTROCARDIOGRAM SIGNALS AND MACHINE LEARNING ALGORITHMS

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ABSTRACT:

The Children with Autism Spectrum Disorder (ASD) have lack Intellectual Development (Thinking) and have impairment in their functional languages (Way of behaving). The recently estimated prevalence of ASD in India indicates that 1 in 125 children in the age group of 3-6 years and 1 in 85 children in the age group of 6-9 are affected by ASD. There is an increase in number of children with Autism Spectrum Disorder every year. Children with ASD will struggle to communicate, dealing with changes (new food, substitute of teacher) and making friends. They also have trouble in Focus, Attention, and Memory, Time management, Emotional control and Frustration.The lack in emotional control makes them prone to emotional outbursts and meltdowns which are difficult to handle by parents and teachers. It will be beneficial to develop a system that can help us find the internal state of children. Researchers in Human Computer Interaction (HCI) and Smart IOT have identified the hidden emotional state of people using physiological signals. Similar algorithms can be developed for children with ASD to identify their internal state. In this work, we focus on identifying the positive and negative emotional states of children using electrocardiogram (ECG) signals. Such system will identify the internal state and notify the parents and caretakers will help in doing the remedial measure or alternative therapies to avoid extreme and aggressive behaviors.

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INTRODUCTION

The Children with Autism Spectrum Disorder (ASD) have lack of Intellectual Development and have impairment in their functional languages. The recently estimated prevalence of ASD in India indicates that 1 in 125 children in the age group of 3- 6 years and 1 in 85 children in the age group of 6-9 are affected by ASD. About 1 in 6 (17%) children aged (3-17 years), where diagnosed with a developmental disability as reported by parents during the period of 2009-2017.There is an increase in number of children with Autism Spectrum Disorder every year. ASD can be diagnosed at the age of 2-5 years; it is described as a "Neuro Developmental Disorder". They have difficulty in understanding other feelings and their own emotions. This leads to the sudden emotional outburst and aggressive behavior in these children. ASD children suffers from Sensory issues, Repetitive Behaviors, Restricted interests, lack of social interaction, social awareness. Children with ASD will struggle to communicate, make friends and dealing with changes (new food, substitute of teachers, Alteration of Scheduled manner). They also have trouble in Focus, Attention, and Memory, Time management, Emotional control and Frustration. The lack in emotional control makes them prone to emotional outbursts and meltdowns which are difficult to handle by parents and teachers.

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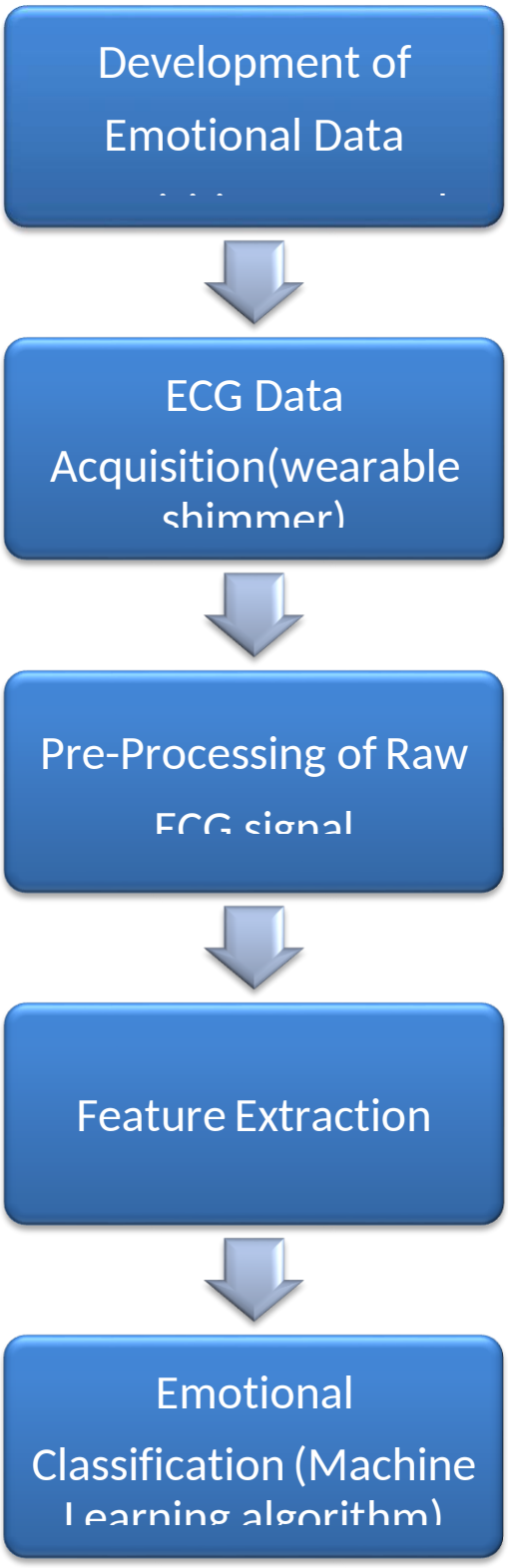
MATERIALS AND METHODS

The methodology of the internal state recognition system is as depicted in the working process. ECG data is acquired from children with ASD using a wearable Shimmer ECG device when subjected to view the audio and audiovisual cues pertaining to 'Like' and 'Dislike' states. The artifacts and noises in the acquired signals were removed by pre-processing the raw ECG signal using various digital filters. Statistical, linear and nonlinear features were extracted from the filtered ECG, HRV and QRS signal using discrete wavelet transform. The features were then classified using three machine learning algorithms namely SVM, KNN and ensemble classifiers.

WORK PROCESS

1. **Development of Emotional Data Acquisition Protocol**

As the characteristics of children with ASD are highly subjective, a protocol to elicit the positive and negative valence states was specifically designed for each child. This was done by observing the child in any environment for a week and interviewing with the parents and teachers to understand their various 'Like' and 'Dislike' of the child. The experimental protocol for each child had three trials with ten minutes of break in-between each trial which lasted for 30 to 40 min. 150 (audio and visual stimulus) including advertisements, film songs, cartoons, rhymes, news, sports, thunderstorm, sound of crackers, cooker, mixer grinder, vehicles and beach scene were selected depending on the behavioral pattern of the child. Each clip lasted from 16 s to 1 min representing positive and negative valence ('Like' and 'Dislike'). Each trial also started with a baseline period of two minutes and had ten 'Like' and 'Dislike' cues. A time gap of two seconds was allowed between two audio-visual cues



2. *ECG Data Acquisition*

The experiment was conducted in a closed room with the audio-visual system and the instrument used for recording was a small and portable wearable shimmer ECG system with MSP430 microcontroller (24 MHz) with Bluetooth radio RN-42 and a rechargeable 450 mAH lithium battery. It consists of a 5 wire, 4 lead electrodes to measure the lead II type of ECG measurements (right arm, left arm, right leg and left leg)acting as the reference electrode with adhesive child patch electrode along with chest belt . ECG signals were acquired from the children with ASD children as they watched the emotional cues. The experimental procedure was initially briefed to the parents and children. After obtaining the needed consent, trial experiments were conducted for two or three days prior to the actual data collection to make the child feel comfortable and acquaint him to the device and process. During the data collection experiment, the participants were seated comfortably in a chair accompanied by their parents or caretakers. The electrodes of the wearable shimmer3ECG device were connected to them using a chest belt. The children were given their own time to settle down and pre-trials were taken two to three times to calm the children. ECG signals were acquired from the children with ASD as they watched the emotional cues.

3. *Pre-Processing of Raw ECG signal*

The collected raw data's from ECG signal was interrupted with lot of artifacts due to movements, respiration and behavioral activities such as hand flapping, spinning and head rolling. These deviations in data with higher and lower frequency is removed by Daubechies db4 mother wavelet-based algorithm, discrete wavelet transform (DWT) and 6th order low pass (LP) Butterworth filter.

4. *Feature Extraction*

The characteristics of the ECG signal are used to extract the statistical, linear and nonlinear features from ECG signal, HRV and QRS amplitude. The features corresponding to the internal states were extracted from the pre-processed ECG, HRV and QRS data after applying DWT (db2, db4 and db8) for further analysis.

$$\psi_{a,b}(t) = \frac{1}{\sqrt{a}}\psi\left[\frac{t-b}{a}\right] a, b \epsilon R, a > 0,$$

Where a, b ϵ R, a > 0, and R is the wavelet space. Parameters ‘a’ and ‘b’ are the scaling factor and the shifting factor, respectively, since choosing a prototype function as the mother wavelet should always satisfy the admissibility condition,

$$C_\psi = \int_{-\infty}^{\infty} \frac{|\psi(\omega)|^2}{\omega} d\omega < \infty$$

The six well known statistical features used widely in emotion recognition, higher order statistical features and non-linear features as indicated,

$$\mu_x = \frac{1}{N}\sum_{n=1}^{N} X_n$$

Median of raw signal

$$Median(M_m) = (N+1)/2$$

Standard deviation of raw signal

$$\sigma_x = \frac{1}{N-1}\sum_{n=1}^{N}(X_n - \mu_x)^2$$

5. *Emotional Classification (Machine Learning algorithm)*

The results of significant features of ECG data, HRV and QRS for db2, db4 and db8 wavelets used to identify the ‘Likes’ and ‘Dislikes’ of the children with ASD.

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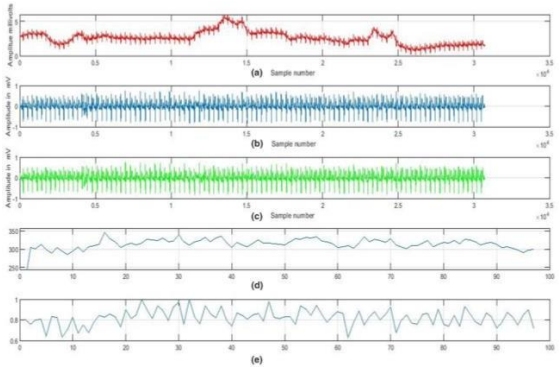
In this work, we focus on identifying the positive and negative emotional states of children using electro -cardiogram (ECG) signals. Such system will identify the internal state and notify the parents and caretakers will help in doing the remedial measure or alternative therapies to avoid extreme and aggressive behaviors.



a) Raw ECG signal,

b) Baseline wander removed signal,

c) Low pass filtered signal,

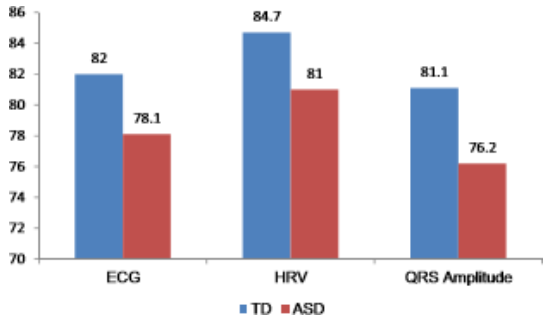
d) HRV data and

e) QRS amplitude

Results and discussion

Baseline wander and high frequency noises were removed from the raw ECG signals using Daubechies db4 mother wavelet-based algorithm and sixth order Butterworth low pass filter respectively as shown in Fig. 5a through c. HRV data and QRS Amplitude was derived from the filtered ECG.

corresponding to the internal states were extracted from the pre-processed ECG, HRV and QRS data after applying DWT (db2, db4 and db8) for further analysis.



Comparison of ECG, HRV and QRS.

Future scope

This application can be easily implemented under various situations. We can add new features and when we require the data was given to the machine learning and it allows software applications to become accurate in predicting outcomes. As humans become more addicted to machines, we are witnesses to a new revolution that staking over the world.

Advantages and disadvantages

- People with autism often outperform others in auditory and visual tasks also better on non verbal test of intelligence.
- Autism people finished 40 percent faster than those without the condition.
- Social isolation

Compliance with ethical standards

Conflict of interest the authors declare that they have no conflict of interest. Ethical consideration Ethical approval was obtained from the Ethics Committee of National Institute for Empowerment of Persons with Multiple Disabilities (NIEPMD), Chennai regarding the protocol and data acquisition procedure prior to performing the experiments. Ethical Approval ID: SE: -0101/2018.

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TITLE
DESIGN OF PARALLEL PREFIX ADDER FOR HIGH SPEED AND LOW SLICE UTILIZATION IN FPGA

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ABSTRACT:
This mini project comprises the different types of adders comparing with parallel prefix adder and its characteristics. Adder is used to do an arithmetic operation, like addition, multiplication, accumulation etc., Likewise, there is N number of adders are available with specific characteristics. Based on these adders are divided into three categories comparing to other adder, Parallel Prefix Adder (PPA) gives a best performance in slicing, area consumption and delay. In PPA adders, combining of Han Carlson and Ladner Fischer adder combined together and designed a new hybrid proposal. This can shows a best result in simulation by occurs moderate power consumption and less delay of designing high speed applications, In upcoming sessions we are going to discuss about the different types of adder and my new proposal along with simulation results of hybrid design of parallel prefix adder.

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Keywords: Adder – Parallel Prefix Adder (PPA) – Han Carlson adder - Ladner Fischer adder - Hybrid proposed adder – Area – Delay – Simulation Result.

1. Introduction

Adders are one of the critical elements in the VLSI chips because they have variety of usages such as ALU's, program counting, memory addressing, floating point arithmetic units. Among them, prefix adders are based on parallel prefix circuit theory which provides a solid theoretical basis for wide range of design trade-offs between area, delay and circuit of wiring complexity. Parallel prefix adder is the most flexible and widely- used binary adder for ASIC designs. Many High-level synthesis techniques have been developed to find optimal prefix structures for several applications. Carry look-ahead adder is designed to overcome the latency introduced by the rippling effect of the carry bits. Parallel prefix adders allow more efficient implementations of the carry look-ahead technique. These are nothing but a two level carry look-ahead adders. They are among the best adders with respect to area, time, cost, performance and especially for high-speed addition of large numbers. The most important aspect of prefixes is that, they, and their sub-terms can be computed in parallel. This follows from the property of associatively.

2. Pre-computational process

For the computation of carries, first, the carry generate a signal block, G_i^j is obtained as,

$$G_j^i = \begin{cases} G^i \\ G_{k+1}^j + P_{k+1}^j G_i^k \end{cases} \text{ ifi<j} \quad ; \text{ if i<=k<j} \qquad \text{Eq 1}$$

This expression indicates the different ways in which the bit level Pi and Gi may be combined to get the corresponding block signals. Similiarly the carry propagate signal block can be expressed as,

$$P_i^j = \begin{cases} P^i \\ P_{k+1}^j \end{cases} \text{ ifi=j} \quad ; \quad \text{if i<=k<j} \qquad \text{Eq 2}$$

From the above expressions, we can conclude the final set of equation as,

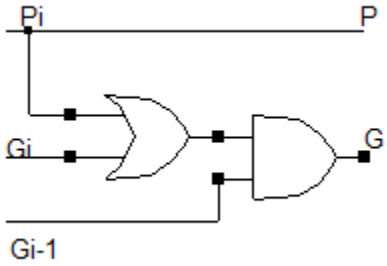
$$\left(G_{k+1}^j, P_{k+1}^j\right) \bullet \left(G_i^k, P_i^k\right) = \left(G_{k+1}^j + P_{k+1}^j G_i^k, P_{k+1}^j P_i^k\right) \qquad \text{Eq 3}$$

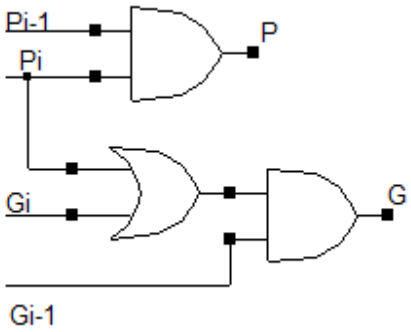
$$= \left(G_i^j, P_i^j\right)$$

Because of this associative property, the sub-terms that form the generate and propagate signal blocks can be computed in parallel. Another important property is the idempotency which means that the blocks need not be contiguous but there may be some overlap. This is useful in enhancing the ways in which parallelism can be exploited. Parallel prefix adders differ primarily in the details of the carry prefix tree, in which the block generate and block propagate signals as well as the carries are formed. By varying the selection of sub terms in the corresponding full expressions of the block signals, and therefore varying the fan in and fan out requirements as well as the length of the interconnections, different adders are obtained that span cost-performance design-space. One aspect that all adder-designs have in common is that the operational time of all O (log n) which is the number of levels in the prefix tree, although the constants involved can vary substantially. Listed below are the different types of parallel prefix adders. For constructing of the optimal circuit we go for the inclusion of back cells and grey cells. Black cells normally occupies the entire (p,g) generation block except for the critical path where grey cells are provided for optimization since it travels the farthest path.

The black cell will consist of both P and G calculations as in

Grey cell **black cell**





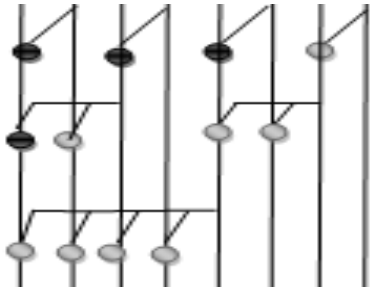
{P,G}={pi*pi-1,gi+pi*gi-1} {P,G}={pi,gi+pi*gi-1}

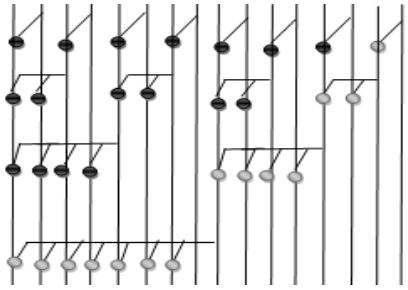
4. Parallel prefix adder topologies:

Now we are going to discuss about the existed adders. They are Sklansky adder, Kogge stone adder, Ladner Fischer adder, Han Carlson adder, Knowles adder. These adders are already published by calculated delay, area and wiring complexity. Now, I design a new adder is called proposal adder. Let we discuss, how my adder is working by comparing of others adder by calculating delay, area consumption and circuit complexity of adder.

i.Sklansky adder:

The sklansky adder reduces the delay to $\log_2 N$ stages by computing intermediate prefixes along with large group prefixes. The logical depth of this adder topology is O ($\log_2 N$), the number of nodes per stages =N/2 and total cost function is C(K)=N/2 $\log_2 N$. Therefore, this adder presents a minimum logic depth and the least routing tracks. Due to the large fan out, the area circuit is effected.

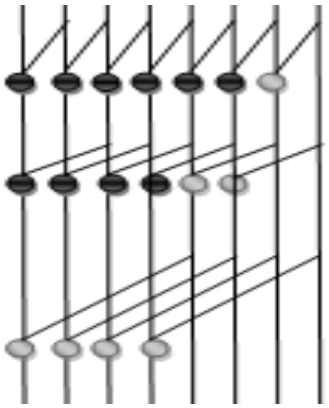




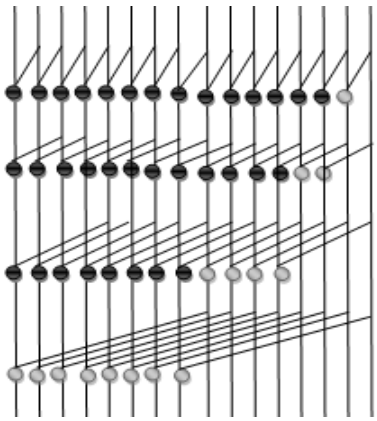
a)**sklansky 8-bit architecture** **b)sklansky 16-bit architecture**

ii.Kogge stone adder:

Kogge-stone adders are the fastest prefix tree. The main features of this adder are that, it has minimum logic depth, regular structure and uniform fan out. The kogge stone tree achieves both $\log_2 N$ stages and fan out of 2 at each stage. Recursive doubling is the technique used in this algorithm .The logical depth of this adder topology is $\log_2 N$, the number of nodes per stages $=N-2^n$where n=stage index (n=0,1,---n-1) and the total cost function is $C(K)=N\log_2 N-N+1$. Though it has both optimal depth and low fan out, it produces high complex circuit realizations and also account for large number of interconnects. The main disadvantages are large number of wires, large computational nodes and high-power dissipation.



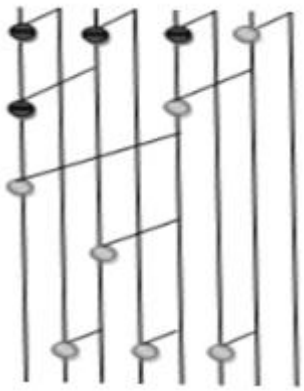
a)koggestone 8-bit architecture



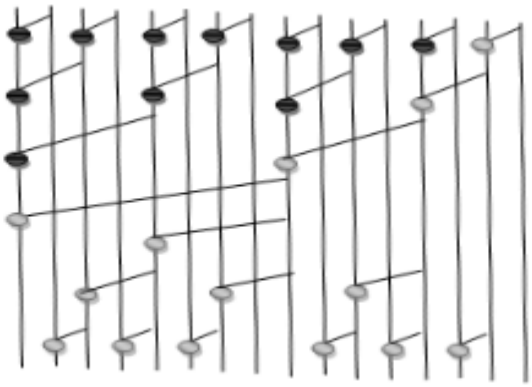
b)koggestone -16 bit architecture

iii.Brent Kung adder:

The Brent–Kung adder is a parallel prefix form carry look-ahead adder. It has a high logic depth. It is considered as one of the better tree adders for minimizing wiring tracks, fan out, and gate count and it has the minimum number of nodes possible. That addresses the problems of connecting gates in a way to minimize chip area. The operational delay is due to the lengths of interconnection (logic depth) and also the critical path in this adder is long. The logical depth of this topology is $2\log_2 N-1$, the number of nodes per stages $=n/2^i$and the total cost function is $C(K) =N/2\log_2 N$. A higher number of buffers are inserted in the Brent Kung structure. Even though the area consumption is rounded, it does not affect the energy consumption. The main disadvantage is the presence of too many logic levels.



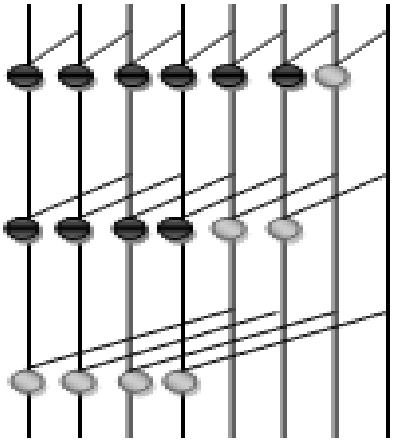
a)brent-kung 8-bit architecture



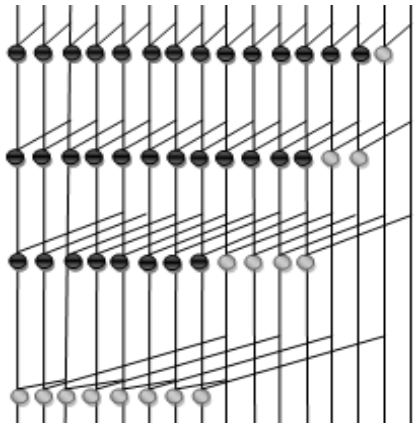
b)brent-kung 16-bit architecture

iv.Knowles adder:

Knowles adder falls between the family of Kogge-Stone and Sklansky. This is used to construct a family of adders focusing on minimum logical depth. These adders are bound by ladner Fischer as there is minimum depth carry trees for static adders and along with Brent Kung topologies as they have minimum number of fan outs. The logical depth of this topology is $\log_2 N$, the number of nodes per stages=n/2 and the total cost function is C (K) $=2\log_2 N-N+1$. Due to the trade-offs between the internal wiring and the fan-out strategies, a better combination of speed and area/power is achieved.



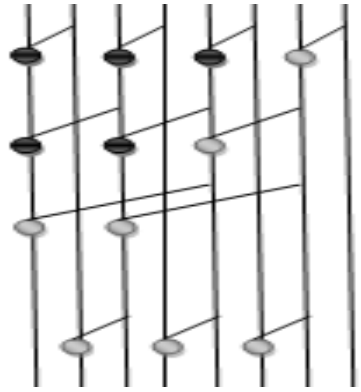
a)Knowles 8-bit architecture



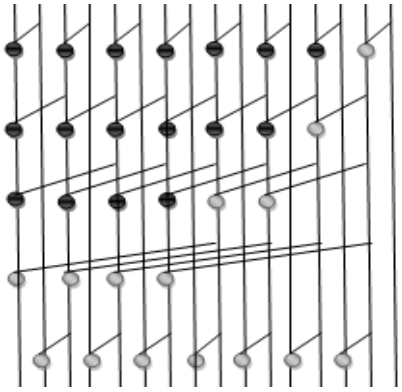
b)Knowles 16-bit architecture

v.Han Carlson adder:

The need for a faster, area efficient and low latency binary adder paved way for deriving a new "hybrid" algorithm. The logical depth of this topology is $\log_2 N+1$, the number of nodes per stages = n/4 and the total cost function is C (K) =$N/2\log_2 N$. This is done by combining the Brent -Kung and Kogge -Stone algorithms. By using the new hybrid algorithm, Thus, it gives a good balance between the logic depth and fan-out. This circuitry is fast as it employs on a near minimum depth prefix algorithm.



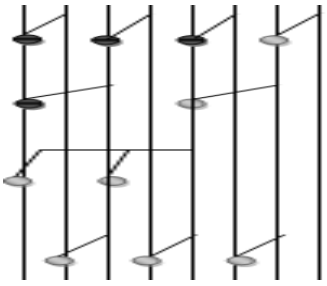
a)Han carlson 8-bit architecture



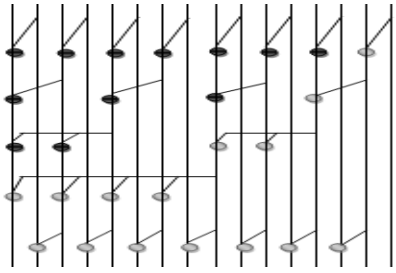
b)Han carlson16-bit architecture

vi.Ladner Fischer adder:

The Ladner Fischer adder is the best-known early prefix adder. The main disadvantage of this adder is that the lateral fan out of the prefix cells doubles at every level. Those additional buffers are used, as this drawback can adversely affect the performance. As there is reduction in the length of horizontal wires, the wire capacitance is reduced The logical depth of this topology is $\log_2 N+1$, the number of nodes per stages=n/4 and the total cost function is C(K)=[$n/2*\log_2 n$]. Adders with ladner Fischer prefix structure require less implementation area but have unlimited fan out comparatively.



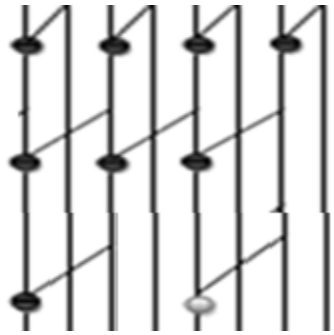
a)Ladner fischer 8-bit adder



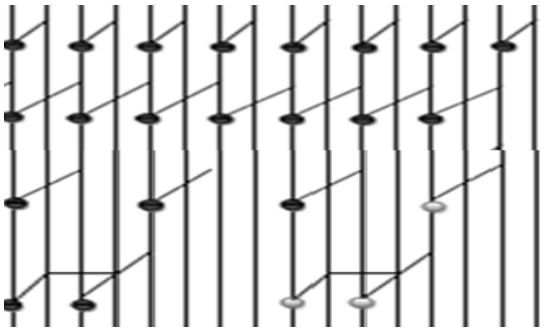
b)Ladner fischer 16-bit adder

vii.Proposed adder:

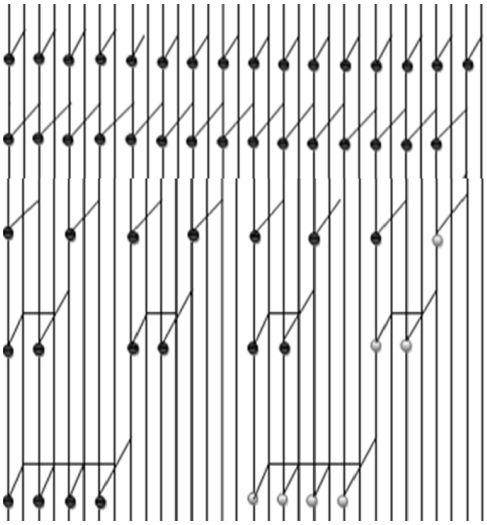
The proposed adder II is the hybrid of Han carlson adder and the ladner fischer adder. This adder follows the Han carlson adder for its first stage and then the remaining is followed by ladner fischer adder. Thus it has the fastest speed feature of the Han carlson adder . It has the order of logN and the numbers of nodes are N/2-1 and N/4. The total number of computational nodes are N-1+(log2N-2)N/4. Since the ladner fischer adder has very less slices, this feature also enhances the overall improvement of the adder. The architecture for the proposed II for the 8,16,32 and 64 bit adders is depicted in fig.



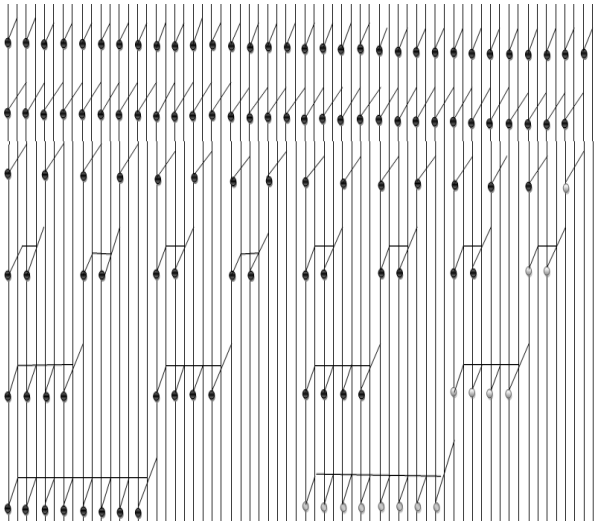
a)proposed 8-bit architecture



b)proposed 16- bit architecture



c)proposed 32-bit architecture

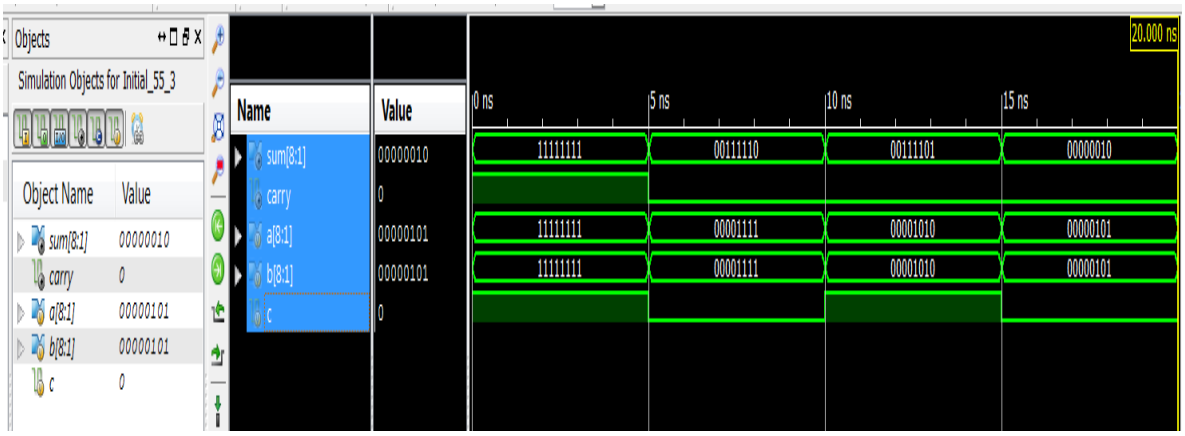


a)proposed 64-bit architecture

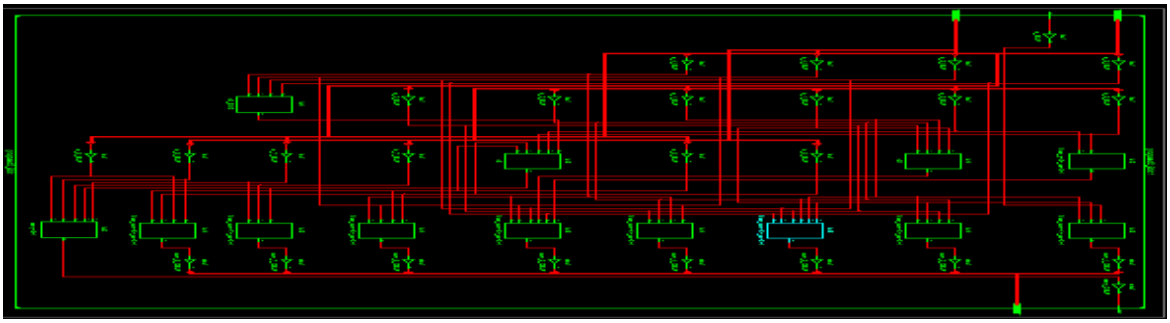
5.SIMULATION RESULT:

The complete simulation of the prefix adders is done using Xilinx tool in the FPGA architecture. The Xilinx ISE tools allow the design to be entered several ways including graphical schematics, state machine diagrams, VHDL and Verilog. The system is an integrated design environment that that consists of a set of programs to create, simulate and implement digital designs in a FPGA device. All the tools use a graphical user interface (GUI) that allows all programs to be executed easily. The simulation result for all the adders is given.

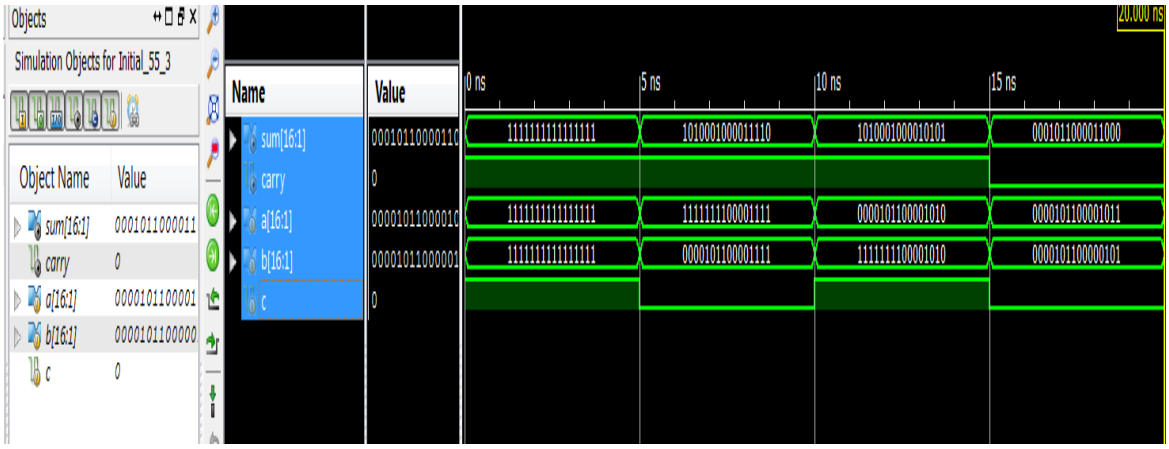
I done a 8, 16, 32, 64 bit architecture. But here I displayed a proposal adder of 8-bit, 16-bit simulation result with technological schemes given below.



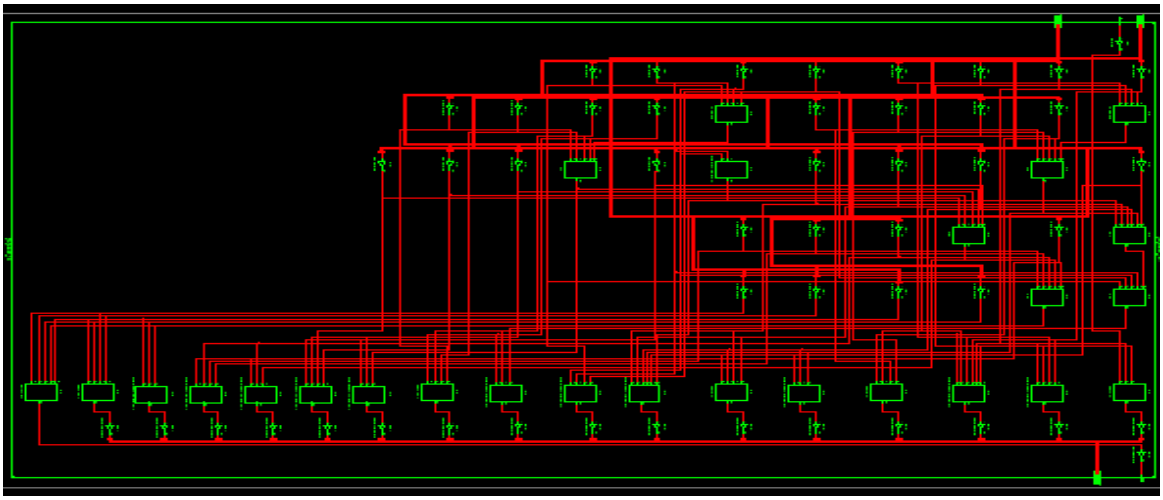
Simulation result for 8-Bit



Technological Schematic for 8- Bit



Simulation result for 16-Bit



Technological Schematic for 16- Bit

proposed2_8bit Project Status			
Project File:	parallelprefix.xise	**Parser Errors:**	No Errors
Module Name:	proposed2_8bit	**Implementation State:**	Synthesized
Target Device:	xc6slx4-3tqg144	• **Errors:**	No Errors
Product Version:	ISE 12.1	• **Warnings:**	7 Warnings (7 new)
Design Goal:	Balanced	• **Routing Results:**	
Design Strategy:	Xilinx Default (unlocked)	• **Timing Constraints:**	
Environment:	System Settings	• **Final Timing Score:**	

Device Utilization Summary (estimated values)			[-]
Logic Utilization	**Used**	**Available**	**Utilization**
Number of Slice LUTs	13	2400	0%
Number of fully used LUT-FF pairs	0	13	0%
Number of bonded IOBs	26	102	25%

Detailed Reports					[-]
Report Name	**Status**	**Generated**	**Errors**	**Warnings**	**Infos**
Synthesis Report	Current	Wed Mar 4 15:27:12 2020	0	7 Warnings (7 new)	0
Translation Report					
Map Report					
Place and Route Report					
Power Report					
Post-PAR Static Timing Report					

Design summary for 8-bit

proposed2_8bit Project Status			
Project File:	parallelprefix.xise	**Parser Errors:**	No Errors
Module Name:	proposed2_8bit	**Implementation State:**	Synthesized
Target Device:	xc6slx4-3tqg144	• **Errors:**	No Errors
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Environment:	System Settings	• **Final Timing Score:**	

Device Utilization Summary (estimated values)			[-]
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Detailed Reports					[-]
Report Name	**Status**	**Generated**	**Errors**	**Warnings**	**Infos**
Synthesis Report	Current	Wed Mar 4 15:27:12 2020	0	7 Warnings (7 new)	0
Translation Report					
Map Report					
Place and Route Report					
Power Report					
Post-PAR Static Timing Report					

Design summary for 16-bit

6.Source code of proposal adder

8 Bit:

```
module hybrid8(
input[8:1]a;  input[8:1]b,  input c,  output[8:1]sum,  output carry  );
wire[8:1]p,g;  wire x1,x2,x3,x4,x5,x6,x7,y1,y2,y3,y4,y5,y6,y7;  wire m1,m2,m3,n1,n2,n3;
wire i1,i2,j1,j2;  wire c1,c2,c3,c4,c5,c6,c7,c8;  wire s1,t1;
```

```
assign p[1]=a[1]^b[1];  assign g[1]=a[1]*b[1];   assign p[2]=a[2]^b[2];   assign g[2]=a[2]*b[2];
assign p[3]=a[3]^b[3];  assign g[3]=a[3]*b[3];  assign p[4]=a[4]^b[4];   assign g[4]=a[4]*b[4];
assign p[5]=a[5]^b[5];  assign g[5]=a[5]*b[5];  assign p[6]=a[6]^b[6];  assign g[6]=a[6]*b[6];
assign p[7]=a[7]^b[7];  assign g[7]=a[7]*b[7];  assign p[8]=a[8]^b[8];  assign g[8]=a[8]*b[8];

assign {s1,t1}={p[1],g[1]};  assign {x1,y1}={p[2]&p[1],(g[2]|p[2])&g[1]};
assign {x2,y2}={p[3],g[3]};  assign {x3,y3}={p[4]&p[3],(g[4]|p[4])&g[3]};
assign {x4,y4}={p[5],g[5]};  assign {x5,y5}={p[6]&p[5],(g[6]|p[6])&g[5]};
assign {x6,y6}={p[7],g[7]};  assign {x7,y7}={p[8]&p[7],(g[8]|p[8])&g[7]};
assign {m1,n1}={x3&x1,(y3|x3)&y1};  assign {m2,n2}={x5&x3,(y5|x5)&y3};
assign {m3,n3}={x7&x5,(y7|x7)&y5};  assign {i1,j1}={m1,(n1,m1)&y1};
assign {i2,j2}={m3&m2(n3|m3)&n2};

assign c1 = t1;  assign c2 = y1;   assign c3 = y2;  assign c4 = j1;  assign c5 = y4;  assign c6 = n2;
assign c7 = y6;  assign c8 = j2;  assign sum[1]=p[1]^c;   assign sum[2]= p[2]^c1;
assign sum[3]= p[3]^c2;  assign sum[4]= p[4]^c3;  assign sum[5]= p[5]^c4;
assign sum[6]= p[6]^c5;  assign sum[7]= p[7]^c6;   assign sum[8]= p[8]^c7;   assign carry=c8;
 endmodule
```

16 Bit:

```
module hybrid16(
input[16:1]a,  input[16:1]b,  input c,  output[16:1]sum,  output carry );
wire[16:1]p,g;
wire x1,x2,x3,x4,x5,x6,x7,x8,x9,x10,x11,x12,x13,x14,x15,y1,y2,y3,y4,y5,y6,y7,y8,y9,y10,y11,y12,
Y13,y14,y15;
wire m1,m2,m3,m4,m5,m6,m7,n1,n2,n3,n4,n5,n6,n7;   wire i1,i2,i3,i4,j1,j2,j3,j4;
wire k1,k2,k3,k4,l1,l2,l3,l4;   wire c1,c2,c3,c4,c5,c6,c7,c8,c9,c10,c11,c12,c13,c14,c15;
wire  s1,t1;
```

```
assign p[1]=a[1]^b[1];  assign g[1]=a[1]*b[1];  assign p[2]=a[2]^b[2];  assign g[2]=a[2]*b[2];
assign p[3]=a[3]^b[3];  assign g[3]=a[3]*b[3];  assign p[4]=a[4]^b[4];  assign g[4]=a[4]*b[4];
assign p[5]=a[5]^b[5];  assign g[5]=a[5]*b[5];  assign p[6]=a[6]^b[6];  assign g[6]=a[6]*b[6];
assign p[7]=a[7]^b[7];  assign g[7]=a[7]*b[7];  assign p[8]=a[8]^b[8];  assign g[8]=a[8]*b[8];
assign p[9]=a[9]^b[9];  assign g[9]=a[9]*b[9];  assign p[10]=a[10]^b[10];  assign g[10]=a[10]*b[10];
assign p[11]=a[11]^b[11];  assign g[11]=a[11]*b[11];  assign p[12]=a[12]^b[12];
assign g[12]=a[12]*b[12];  assign p[13]=a[13]^b[13];  assign g[13]=a[13]*b[13];
assign p[14]=a[14]^b[14];  assign g[14]=a[14]*b[14];  assign p[15]=a[15]^b[15];
assign g[15]=a[15]*b[15];  assign p[16]=a[16]^b[16];  assign g[16]=a[16]*b[16];

assign {s1,t1}={p[1],g[1]};  assign {x1,y1}={p[2]&p[1],(g[2]|p[2])&g[1]};
assign {x2,y2}={p[3],g[3]};  assign {x3,y3}={p[4]&p[3],(g[4]|p[4])&g[3]};
assign {x4,y4}={p[5],g[5]};  assign {x5,y5}={p[6]&p[5],(g[6]|p[6])&g[5]};
assign {x6,y6}={p[7],g[7]};  assign {x7,y7}={p[8]&p[7],(g[8]|p[8])&g[7]};
assign {x8,y8}={p[9],g[9]};  assign {x9,y9}={p[10]&p[9],(g[10]|p[10])&g[9]};
assign {x10,y10}={p[11],g[11]};  assign {x11,y11}={p[12]&p[11],(g[12]|p[12])&g[11]};
assign {x12,y12}={p[13],g[13]};  assign {x13,y13}={p[14]&p[13],(g[14]|p[14])&g[13]};
assign {x14,y14}={p[15],g[15];  assign {x15,y15}={p[16]&p[15],(g[16]|p[16])&g[15]};

assign {m1,n1}={x3&x1,(y3|x3)&y1};  assign {m2,n2}={x5&x3,(y5|x5)&y3};
assign {m3,n3}={x7&x5,(y7|x7)&y5};  assign {m4,n4}={x9&x7,(y9|x9)&y7};
assign {m5,n5}={x11&x9,(y11|x11)&y9};  assign {m6,n6}={x13&x11,(y13|x13)&y11};
assign {m7,n7}={x15&x13,(y15|x15)&y13};

assign {i1,j1}={m1,(n1,m1)&y1};  assign {i2,j2}={m3&m2,(n3|m3)&n2};
assign {i3,j3}={m5&m4,(n5|m5)&n4};  assign {i4,j4}={m7&m6,(n7|m7)&n6};

assign {k1,l1}={m2,(n2|m2)&j1};  assign {k2,l2}={i2,(j2|i2)&j1};
assign {k3,l3}={m6&i3,(n4|m4)&j3};  assign {k4,l4}={i4&i3,(j4|i4)&j3};
```

```
assign c1 = t1;  assign c2 = y1;  assign c3 = y2;  assign c4 = j1;  assign c5 = y4;  assign c6 = n2;
assign c7 = y6;  assign c8 = j2;  assign c9= y8;  assign c10 = n4;  assign c11 = y10;  assign c12 = j3;
assign c13 = y12;  assign c14 = l3;  assign c15 = y14;  assign c16 = l4;

assign sum[1]=p[1]^c1;  assign sum[2]= p[2]^c1;  assign sum[3]= p[3]^c2;  assign sum[4]= p[4]^c3;
assign sum[5]= p[5]^c4;  assign sum[6]= p[6]^c5;  assign sum[7]= p[7]^c6;  assign sum[8]= p[8]^c7;
assign sum[9]=p[9]^c8;  assign sum[10]= p[10]^c9;  assign sum[11]= p[11]^c10;
assign sum[12]= p[12]^c11;  assign sum[13]= p[13]^c12;  assign sum[14]= p[14]^c13;
assign sum[15]= p[15]^c14;  assign sum[16]= p[16]^c15;  assign carry=c16;  endmodule
```

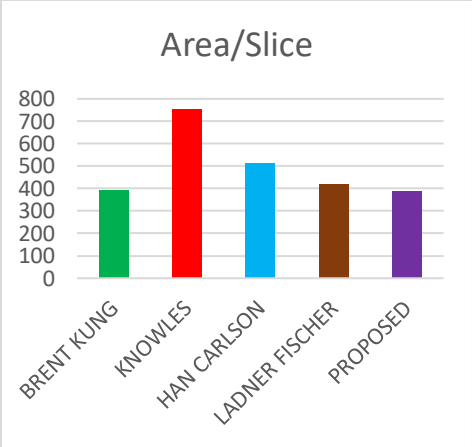

Chart representation for Area

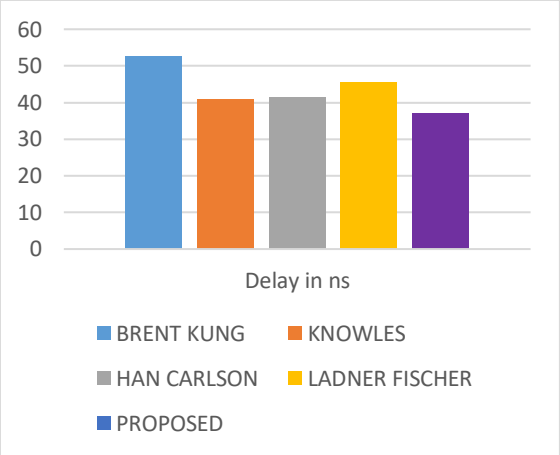

Chart representation for Delay

Filter design With various Adder topology	Rise time delay(before clk) nS	Hold on delay(after clk) nS	SLICES	TOTAL DELAY (nS)
BRENT KUNG	1.731	48.44	392	52.731
KNOWLES	1.731	39.743	753	40.812
HAN CARLSON	1.731	40.233	513	41.305
LADNER FISCHER	1.731	41.149	420	45.449
PROPOSED	1.731	35.6	389	37.137

Characteristics of various parameters for Parallel Prefix Adder

7.Acknowledgement:

I would like to express my special thanks to my staff Dr. Uma who gave me a wonderful opportunity to do this best project on the topic DESIGN OF PARALLEL PREFIX ADDER FOR HIGH SPEED AND LOW SLICE UTILIZATION IN FPGA, which also helped me in doing a lot of research and I came to know about so many things I am really thankful to them. Secondly, I would also like to thank my parents who helped me a lot in supporting to do this this project.

8.Conclusion

Thus the parallel prefix adders were analysed from 8 to 64 bits with the help of xilinx tool in the FPGA architecture. These proposal adder shows the best performance in terms of speed and area occupation. They are very much reliable when compared to the peer parallel prefix adders. The parallel prefix adders are best suited for any kind of a circuit in order to give a high speed performance. The entire performance analysis is also made from which the above mentioned conclusions are derived. This satisfies the demand for a very high speed, less area and a much reliable performance adder circuit.From the analysis done on the above adders, it is found that all the adders with respective to the properties of ideal adder characteristics in the matter of wiring, number of computational nodes and the number of stages.

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TITLE
Evolution of Large Capacity Fiber to the Home Technology(FTTH) in competition with other wireless technologies

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ABSTRACT:
As the broadband revolution continues, the ever increasing competition in the broadband service market is forcing broadband service suppliers to plan their strategies for delivery of "triple play" services, with voice, data and video provided by a single connection. To review the latest developments in the leading broadband access technologies and we assess the ability of those technologies to meet the future requirements of the broadband consumer. We compare and contrast those technologies to the advantages of fiber to the home to determine whether fiber continues to offer the ultimate in broadband connectivity.

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1. INTRODUCTION

Over recent years, as the internet and intranets have evolved, increasing requirements for bandwidth intensive applications such as peer to peer file sharing and tele-working have resulted in relentlessly increasing demands for higher broadband bandwidth provisioning. However it is the bandwidth required by next generation TV and video services, such as Video on Demand (VoD) and, more significantly, high definition TV (HDTV) which have recently begun to place the most pressure on bandwidth provisioning in broadband networks. Even with the latest data compression techniques, HDTV requires in the order of 15 to 20Mbps of downstream bandwidth and this is testing the capabilities of a number of broadband technologies. There are a myriad of competing technologies which can provide the bandwidth required to deliver broadband services, but each technology has its limits in terms of bandwidth, reliability, cost or coverage. Optical fiber offers almost limitless bandwidth capabilities, has excellent reliability *and* is becoming increasingly economical to install. Consequently fiber seems to be unsurpassed in its superiority over the other broadband technologies. However, many competitive copper and wireless technologies are developing at a significant pace and some technologies have so far managed to continually meet the ever increasing bandwidth requirements of the consumer. We review the latest developments in the leading broadband access technologies and we assess the ability of those technologies to meet the future requirements of the broadband consumer. We compare and contrast those technologies to the advantages of fiber to the home (FTTH) to determine whether fiber continues to offer the ultimate in broadband connectivity. The bandwidth requirements of one high definition TV stream and Internet browsing, for instance, it may seem that 20- to 25-Mbps bandwidth is sufficient in the long term.

2. WIRED TECHNOLGIES

Fixed line broadband technologies rely on a direct physical connection to the subscriber's residence or business. Many broadband technologies such as cable modem, xDSL (digital subscriber line) and broadband power line have evolved to use an existing form of subscriber connection as the medium for communication. Cable modem systems use existing hybrid fiber-coax Cable TV networks. xDSL systems use the twisted copper pair traditionally used for voice services by the POTS. Broadband power line broadband technology uses

the power lines feeding into the subscriber's home to carry broadband signals. In general, all three aforementioned technologies strive to avoid any upgrades to the existing network due to the inherent implications for capital expenditure. By contrast, fiber to the home (FTTH) or fiber to the curb (FTTC) networks require the installation of a new (fiber) link from the local exchange (central office) directly to or closer to the subscriber. Consequently, although fiber is known to offer the ultimate in broadband bandwidth capability, the installation costs of such networks have, up until recently, been prohibitively high. The fixed line technologies evaluated here include:

- Hybrid Fiber Coax: Cable TV & Cable Modems
- Digital Subscriber Line (xDSL)
- Broadband Power Line (BPL)
- Fiber to the Home/Curb

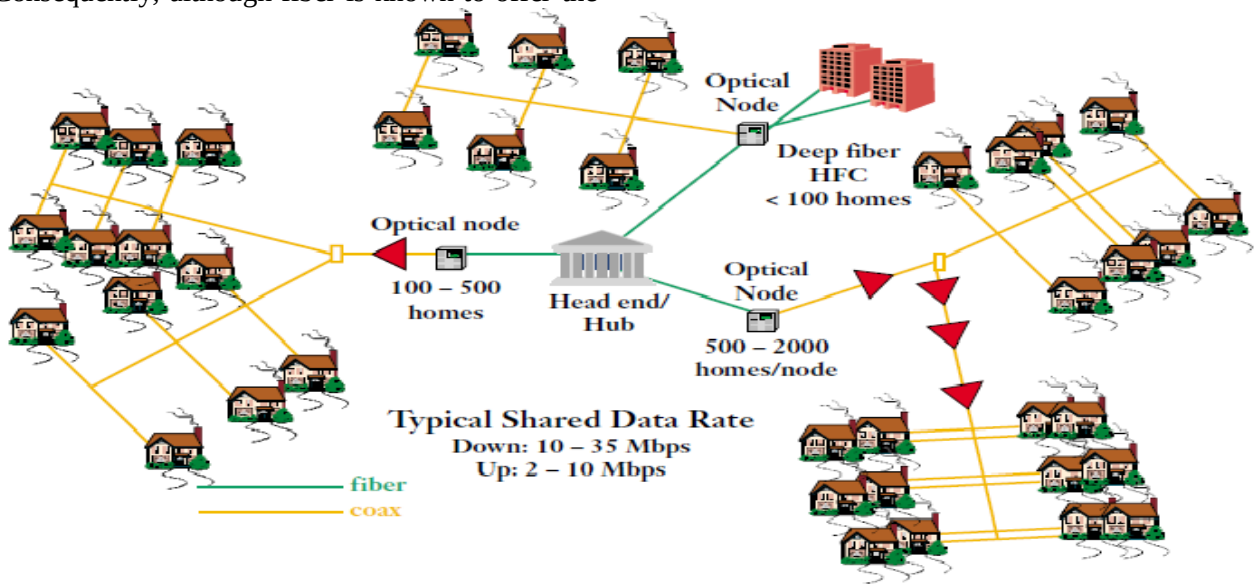

Figure1. Cable TV, Hybrid Fiber Coax Architecture

Hybrid Fiber Coax (HFC): Cable TV & Cable Modems

Digital cable TV networks are able to offer bi-directional data transfer bandwidth in addition to voice and digital TV services. Using a cable modem in the customer premise and a Cable Modem Termination System (CMTS) at the network's head-end, the well established HFC standard, DOCSIS 1.1, provides for a data transmission service with speeds of up to a 30 Mbps on one 8 MHz channel (6 MHz is used in the US) using QAM modulation techniques. The recently proposed HFC standard, DOCSIS 3.0, may be capable of 100 Mbps of bandwidth per channel in the near future. Data transmission over Cable TV networks has the advantage that where the coaxial cable is in good condition and RF amplifiers exist (or can be installed) to extend the network reach, relatively high bandwidths can be provided to the end user without distance limitations. However, a cable TV broadband service relies on a shared network architecture (see Figure 1); this results in the limitation that the amount of bandwidth delivered to the customer is dependant on how many people share the connection back to the head-end. Typically a service of 1 Mbps downstream and 128 kbps upstream is offered (more recently a 3-5 Mbps downstream service has become available), but up to 1000 users may share the connection to the head-end and so the actual bandwidth obtained can be lower due to excessive loading of the system by other users.

Digital Subscriber Line (xDSL) DSL technology uses the existing copper telephone infrastructure to facilitate high speed data

connections. DSL equipment achieves this by dividing the voice and data signals on the telephone line into three distinct frequency bands. For example with Asymmetric DSL

in U.S.) band (as they are in all POTS circuits), the upstream data channel is carried in a band between 25 and 160 KHz and the downstream data channel begins at 240 KHz and goes up to about 1.1 MHz. Complex data modulation techniques enable data rates of up to 12Mbps. DSL access modules (DSLAMS) are placed in the local exchange or at nodes in the access network to transmit and receive the data signals. However xDSL has the disadvantage that it is a distance-sensitive technology. As the connection length from the user to the DSLAM increases, the signal quality decreases and the connection speed goes down (see Figure 2). There a number of different DSL technologies, the key ones are ADSL

SDSL(symmetric), VDSL(Very high bit rate DSL) and ADSL2+. More recently, ADSL2++ has been introduced. In order to maximize network coverage out to the full 5.4 km, the ADSL speeds widely offered today in Europe are 500 Kbps downstream, with upstream speeds from 128 Kbps. For business applications it is possible to get Symmetric DSL (SDSL) which allows high speed download and uploads, but again the maximum available bandwidth is around 3Mbps. With VoD requiring at least 3Mbps and HDTV requiring approximately 15 to 20 Mbps, clearly neither ADSL or SDSL can meet the bandwidth requirements for HDTV and may well struggle to provide VoD and/or a basic video service over the full network.

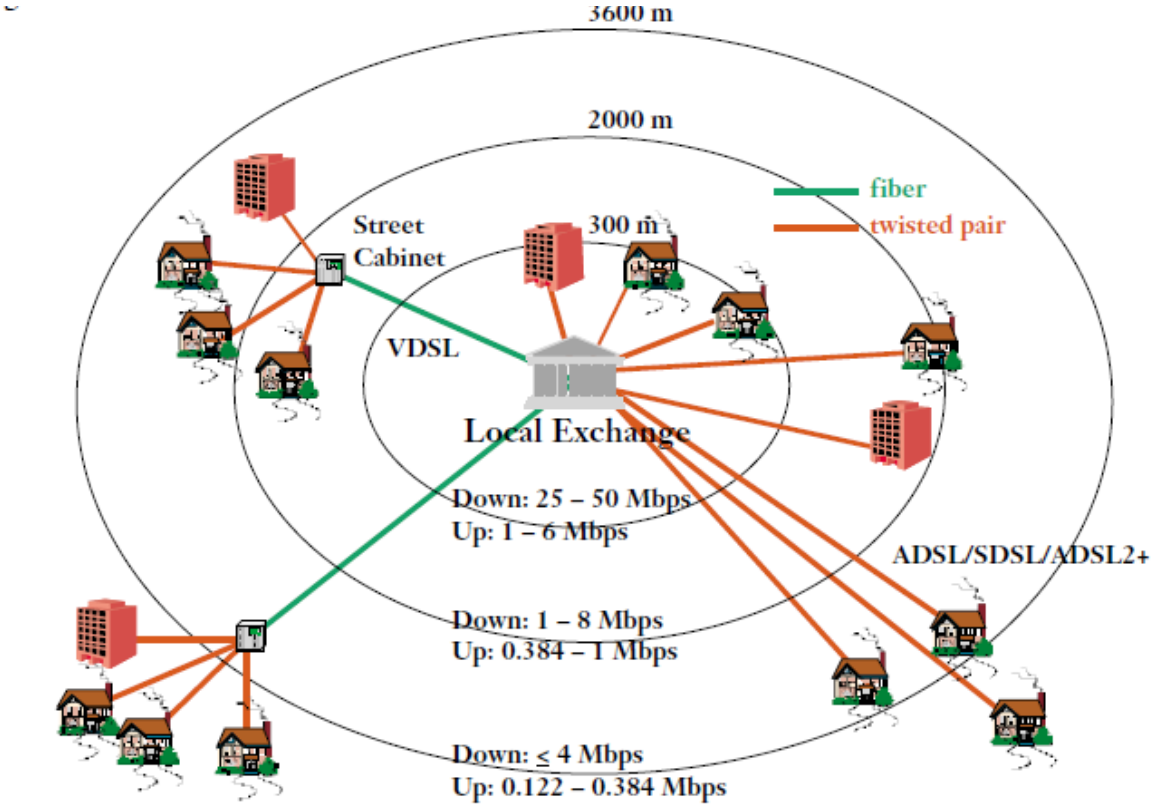

Figure2. XDSL Architecture

However, VDSL and the more recently introduced ADSL2+ can offer bandwidths high enough to allow video services. VDSL seemed to offer up to

52Mbps, but only over very short distances. Therefore in order to offer VDSL to a significant

proportion of the population the DSLAMs need to be relocated to street cabinets (closer to the subscriber) and fiber feeds installed to the street cabinets. The cost of this upgrade and laying fiber to the cabinets means that VDSL is prohibitively expensive relative to ADSL technology and VDSL deployments have been limited. The latest technologies to emerge from the DSL family are ADSL 2+ and ADSL 2++. ADSL2++ is still in its infancy and is not yet supported by an appropriate standard.

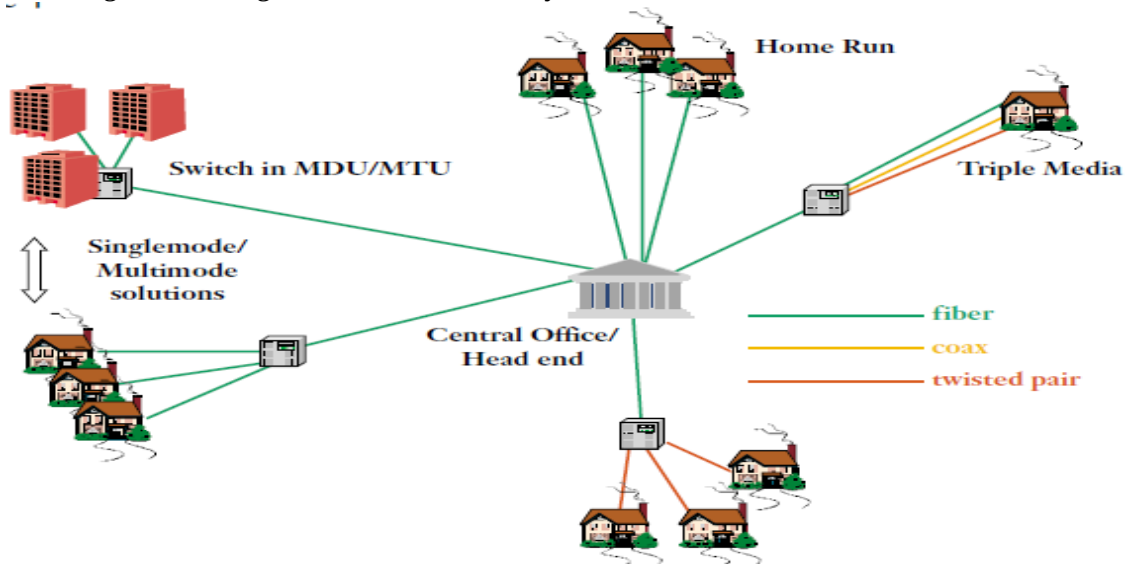

Figure 3. P2P Architecture

Broadband Power line (BPL)

BPL systems allow for high speed data transmission over existing power lines, and do not need a network overlay as they have direct access to the ubiquitous power utility service coverage areas. BPL systems are being promoted as a cost-effective way to service a large number of subscribers with broadband. In a BPL system, the data is transmitted over the existing power line as a low voltage, high frequency signal which is coupled to the high voltage low frequency power signal. The frequency transmission band has been chosen to ensure minimum interference with the existing power signal. Typical data rates in current trials are 2 to 3 Mbps, but vendors have indicated that commercially systems offering up to 200 Mbps could eventually become available. However, there is no clear upgrade path to higher data rates. Most BPL systems at present are limited to a range of 1km within the low voltage grid, but ome operators are extending this reach in to the medium voltage grid. Experience has shown that BPL requires a high investment cost, to upgrade the power transmission network and bypass transformers, to support high speed and reliable broadband services. In addition, the frequencies used for BPL often interfere with amateur radio transmission and some BPL trials have consequently suffered considerable opposition.

Fiber to the Home/Curb(P2P Architecture)

The common FTTH architecture is a point-to-point (P2P) network (see Figure 4), which is often referred to as an All Optical Ethernet Network (AOEN). In this solution, each home is directly connected by optical fiber to the local exchange. This provides a dedicated line of connection to the operator for each subscriber, which is the main advantage of P2P networks over PONs. The dedicated connection lines of a P2P network facilitate subscriber specific service supply, higher

subscriber bandwidth with improved traffic security, and simple provision of symmetric services. The P2P network architecture is similar to the common enterprise Local Area Network (LAN) design and so has the advantage of being able to use existing components and equipment, which helps to reduce system cost. However, P2P networks require actives in the field which can increase installation, operating and life-cycle costs and also reduce reliability.

Fiber to the Home/Curb

FTTH is a generic term for those technologies which bring fiber, a step closer to the subscriber. However, not all fiber solutions in access networks bring the fiber directly to the home/subscriber as shown in Figure 4. Some technologies in the access that rely on fiber, like VDSL, bring fiber from the local exchange (central office) down to a node in the access network or to the curb, where equipment is housed in a street cabinet to convert signals from optical to electronic, ready for the final hop to the subscriber over twisted copper pair. This level of fiber provision in the network would be called FTTC (fiber to the curb) or FTTN (fiber to the node). Other architectures include FTTB (fiber to the building) and FTTP (fiber to the premises) where the fiber is brought as far as the building and then distributed amongst the resident subscribers over twisted copper pair or using wireless technology. FTTH is the ultimate fiber access solution where each subscriber is connected to an optical fiber. As FTTH has matured, applications have converged on to two consensus solutions. The first is the Passive Optical Network, or PON. PONs have been described for FTTH as early as 1986. In this architecture the main signal from the local exchange is passively split such that it is shared by between 16 and 32 subscribers (see Figure 3). Privacy is ensured by time shifting, and personal encryption of each subscriber's traffic. Upstream traffic is enabled by Time Division Multiple Access (TDMA) synchronization. Fixed network and exchange costs are shared among all subscribers. This reduces the key cost per subscriber metric. The PON solution benefits from having no outside-plant electronics. This reduces network complexity and life-cycle costs, while simultaneously improving reliability.

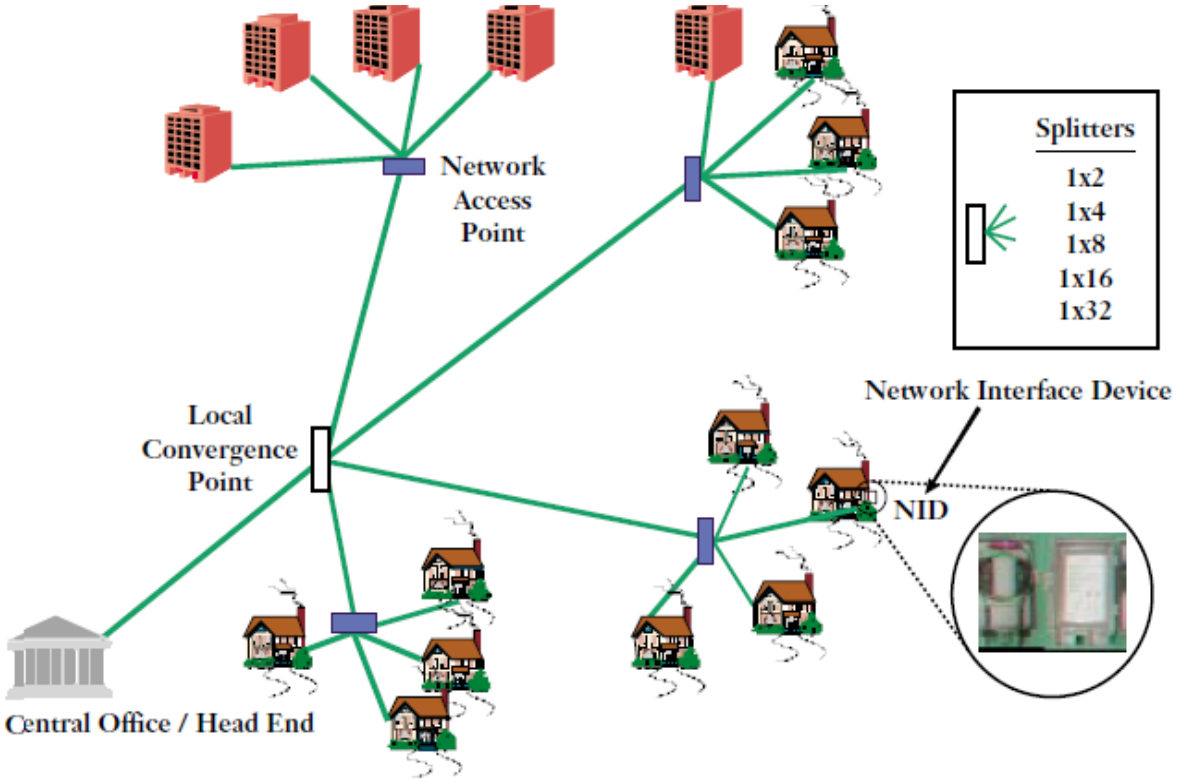

Figure 4 PON Architecture

3. WIRELESS TECHNOLOGIES

Generally, wireless broadband refers to technologies that use point-to-point or point-to-multipoint microwave in various frequencies between 2.5 and 43 GHz to transmit signals between hub sites and an end-user receiver. While on the network level, they are suitable for both access and backbone infrastructure, it is in the access network where wireless broadband technology is proliferating. As a consequence, the terms "wireless broadband" and "wireless broadband access" are used interchangeably. There are a wide range of frequencies within which wireless broadband technologies can operate, with a choice of licensed and unlicensed bands. Generally speaking, higher frequencies are advantaged relative to lower frequencies as more spectrum is available at high frequencies and smaller antennas can be used, enabling ease of installation. Most higher bandwidth systems use frequencies above 10 GHz. However, high frequency systems are severely attenuated by poor weather conditions (e.g. rain or fog) and therefore suffer from distance limitations. Wireless technologies can be broadly categorized into those requiring line-of-sight (LOS) and those that do not. Point-to-point microwave, Local Multipoint Delivery System (LMDS), Free Space Optics (FSO), and Broadband Satellite all require line-of-sight for reliable signal transmission while cellular technologies like GSM, CDMA, 3G, WiFi, WiMax, and fixed wireless broadband technologies like Multipoint Multichannel Distribution System (MMDS) require no line-of-sight between the transmission hub and receiving equipment. Clearly, the non line-of-sight (NLOS) technologies provide advantages in terms of ease of deployment and wider network coverage. This section gives an overview of each of these wireless technologies. The technologies evaluated here include as follows.

Microwave Links Microwave links are the traditional workhorse of fixed-wireless broadband systems and were around long before the term wireless broadband was coined. It is the point-to-point LOS wireless transmission method for up to 155 Mbps (STM1 or OC-3), with a range of up to 5 km. Single channel microwave links are relatively

inexpensive and simple to install. This is particularly true in areas of difficult (e.g. mountainous) terrain or of high population density where the installation costs of a traditional buried cabled network are prohibitively high. However, microwave networks have the great disadvantage of being limited by a very low data rate and are therefore of little use for high capacity links or for networks where it is essential to ensure that bandwidth capability is never outstripped by consumer bandwidth demand. Microwave capacity can be enhanced by installing more links, but deployment of additional links will soon push the overall cost of a microwave network to the point where it outstrips the cost of a much higher bandwidth traditional buried cables system. For networks with a low predicted capacity, microwave can be the lowest cost solution, but microwave will inhibit significant capacity expansion and in the longer term may result in lost business opportunity.

MMDS (Multichannel Multipoint Distribution Service)

For a wide coverage area, a microwave system will require a multitude of point to point links. MMD allows the point-to-point antenna system used for microwave links to be replaced by a sector antenna in the transmitting base station which sends signals to multiple locations within a 60° or 90° angle sector (see Figure 5). By overcoming the point to point limitations of microwave links and enabling a wide coverage area, MMDS offers a microwave solution with a reduced cost per link. MMDS uses this point to multipoint architecture to deliver television signals and, more recently, telephone/fax and data communications.

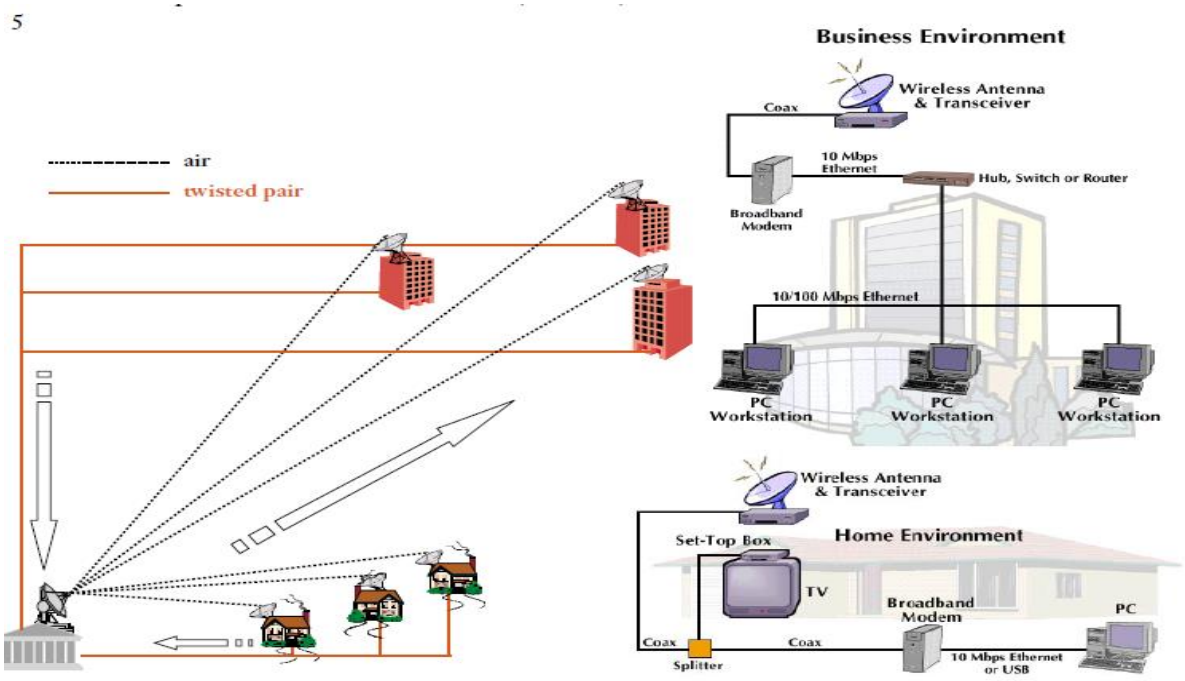

Figure5 Multichannel Multipoint Distribution service (MMDS) Network Architecture

LMDS (Local Multipoint Distribution Service) Like MMDS, LMDS uses a sector antenna at the base station to transmit in a point to multi-point fashion over a wide coverage area (see Figure 6). By operating in the higher UHF radio frequencies (27.5 GHz to 31 GHz), LMDS can offer much higher bandwidth but the range of the radio signals is limited to approximately 8 km, due

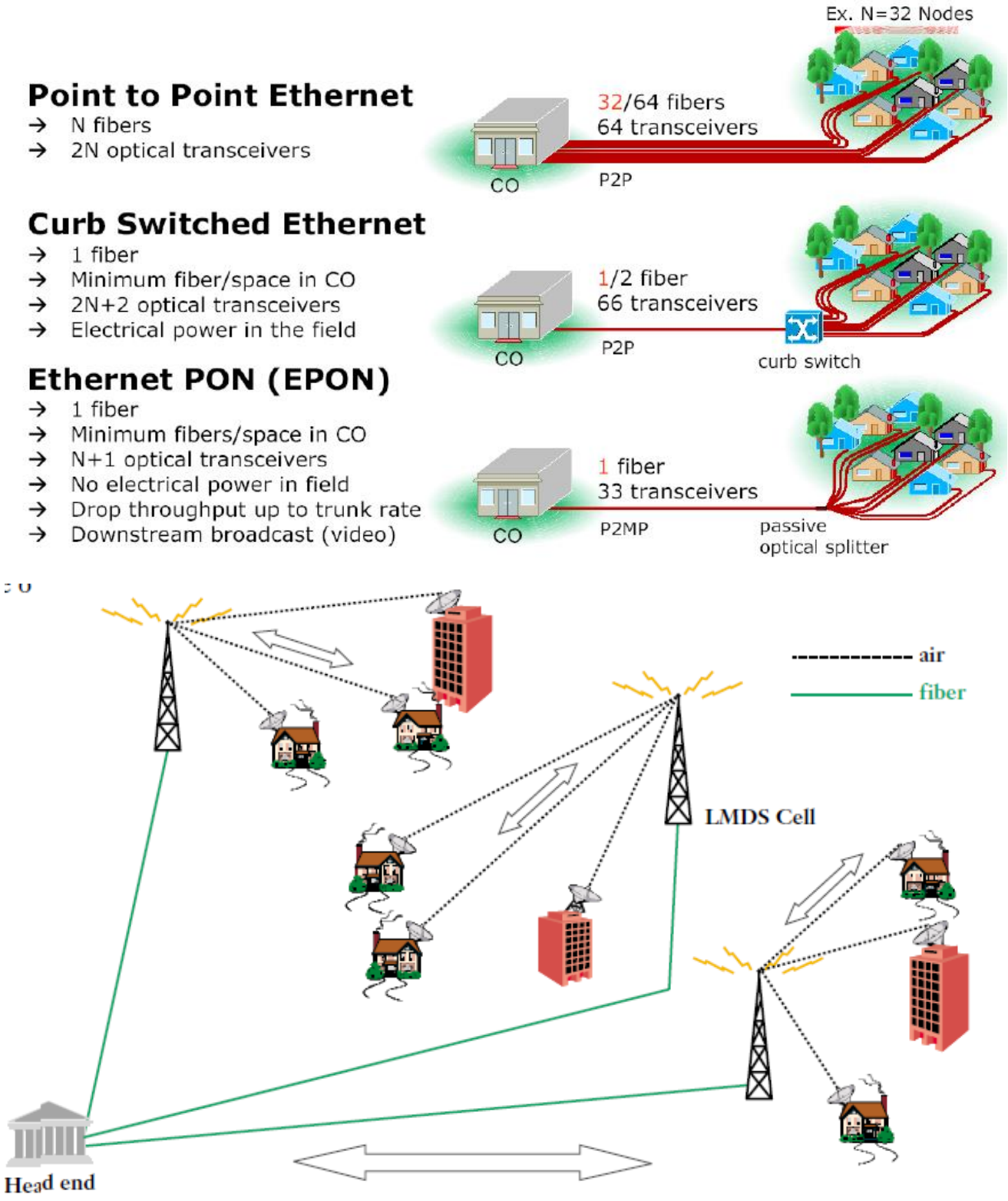

Figure 6 Local Multipoint Distribution Service (LMDS) Network Architecture

to higher free space attenuation. Hence, it is a very localized service. In the US LMDS has been allocated the 27.5 to 29.5 GHz band and is currently intended to deliver digital TV services with each channel occupying 20 MHz of bandwidth. LMDS can also used to provide offers a more economical solution for wide area coverage than point to point microwave links. However, LMDS is distance limited and the ultimate subscriber capacity and their respective maximum data rate are also limited by the available radio spectrum. solution is the use of remote optical distribution frames, as discussed in the context of LLU. However, this equipment adds considerable cost that is usually not compensated by the improvement in PON utilization.

licensing requirements as FSO systems use a light signal instead of a radio wave. However, due to the point-to-point nature of FSOsystems, they are not cost effective for the wide area coverage required for competitiveness in today's broadband consumer market. In addition, free-space optics are susceptible to system outage in poor weather conditions. FSO systems are therefore primarily suited to private applications.

WiFi (Wireless Fidelity)

WiFi is a highly localized adaptation of MMDS, which does not require LOS. Based on the IEEE 802.11x standard and transmitting in unlicensed spectrum at 2.4 GHz, WiFi operates in the low frequency area of UHF in a point to multi-point fashion. The increased penetration of signals at these frequencies allows WiFi transmitters to operate at low power and still achieve ranges of up to 30 meters in doors and up to 450 meters outdoors. The main application of WiFi is to provide highly local wireless radio links to end user communications

two-way broadband services such as voice, data, video and internet. Each LMDS channel is capable of 45 Mbps downstream (with an upper limit of 155 Mbps) but requires LOS between the base station and customer transceiver.

FSO (Free Space Optics).

The main advantages of FSO systems are the low installation costs and avoidance of radio spectrum A FSO system employs the use of infra-red sources or lasers to support free-space data transmission rates of between 10Mbps and 1.25Gbps between a transmitter and a receiver over distances of up to 4km. LOS is required for such system, which operate at THz frequencies in the RF spectrum

equipment (e.g. PCs, VoIP phones) within customer premises/residences.

WiMAX (Worldwide Interoperability for Microwave Access)

WiMAX is the latest wireless broadband technology which is designed to deliver WiFi type connectivity over a much greater range and thereby compete as a point-to-multipoint last-mile broadband wireless access solution. It is important to note that there are two types of WiMAX; line of sight (LOS) and non-line of sight (NLOS). The using the radio spectrum are limited in capacity by the bandwidth available. For satellites operating in LOS WiMAX systems are point to point operation only while the NLOS WiMAX systems are point to multi-point. Although the LOS systems have much better reach capabilities, they will not facilitate a large consumer service coverage area and so it is the much shorter reach NLOS systems which are being developed to offer an alternative large-scale consumer broadband service technology. WiMAX is based on the IEEE 802.16 standard and the latest amendment, to facilitate mobile services, has just been standardized. WiMAX equipment

suppliers aim to provide fixed, nomadic, portable and, eventually, mobile wireless broadband connectivity without the need for direct line-of-sight with a base station within a given sector cell. In a typical cell radius deployment of 3 to 9 km, WiMAX Forum Certified™ systems aim to ultimately deliver capacity of up to 75 Mbps per channel, for fixed and portable access applications. Mobile network deployments are aiming to provide up to 15 Mbps of capacity within a typical cell radius deployment of up to 3 km. However, current practical bandwidth capabilities are much lower and as WiMAX is a shared bandwidth technology, the ultimate bandwidth delivered to a subscriber can be lower than the channel capacity and will depend on the customer per channel contention ratio.

Direct Broadcast Satellite (DBS)

Primarily a direct-to-home digital TV broadcasting wireless solution, newer Direct Broadcast Satellite (DBS) services also provide two-way high-speed data transmission services. DBS uses geostationary satellites operating in the Ku band with a 12 GHz downlink and a 14 GHz uplink. Figure 7 shows the architecture of a DBS wireless broadband network, where the satellite relays the composite signal of digitized video and data services from a headend via an earth station and then broadcasts that signal to an area of targeted subscribers. Data rates of between 16 kbps and 155 Mbps can be obtained but the major drawback is that geostationary satellites being 22,300 km from the earth's surface introduce a 250 ms delay into the networkbroadband services this latency is unacceptable. The use of a network of low-earth-orbit or LEOS satellites orbiting at only 1000 km will reduce this latency to 50 ms but such systems are not widely available as yet. However, satellites, like asystems using the radio spectrum are limited in capacity by the bandwidth available. For satellites operating in the Ku band there a limit of 2 GHz of available bandwidth.

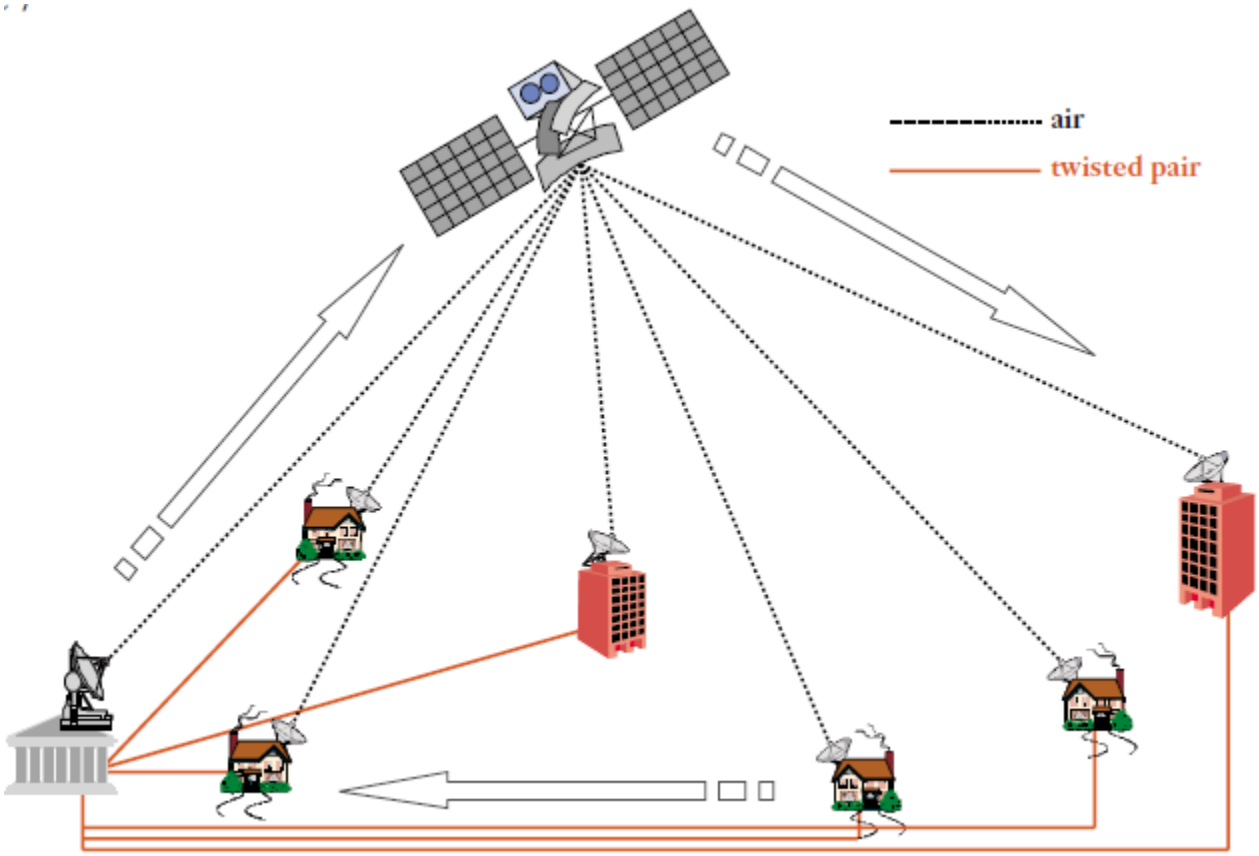

Figure7 Direct Broadband Satellite (DBS) Architecture

Mobile Phone Networks: 2G and 3G Networks

UMTS(Universal Mobile Telecommunications Services), which is also known as 3G, is the next generation high speed mobile system for the existing 2G and 2.5G digital cellular systems that are based on GSM (Global Systems for Mobile). Since the introduction of GPRS, mobile phones have had data transfer and internet connectivity and as a consequence can be considered as a broadband solution. Standard digital GSM based mobile phone services of the 2G era offer voice and low data rates. GSM networks are circuit switched and use a combination of the TDMA (Time Division Multiple Access) and FDMA (Frequency Division Multiple Access) standards to enable multiple subscriber bandwidth access at data transfer rates of up to 14.4kbps. A more advanced mobile bandwidth access technology is CDMA (Code Division Multiple Access) but this was not adopted for GSM.GPRS (General Packet Radio Service) is an additional technology which is applied as an overlay on GSM networks to facilitate higher data rates (up to 170 kbps) and transfer of larger data files. GPRS involves overlaying a packet-based air interface on the existing circuit switched GSM network. This gives the user the option to use a higher data rate packet-based data service. As GPRS introduces packet switching and IP to mobile networks, it therefore functions as an interim step for GSM networks on the route to 3G services. GPRS enables simultaneous voice and data handling. GPRS users can have always-on connectivity to the internet, high speed delivery of emails with

large file attachments, web surfing using WAP (wireless access protocol) and access to corporate LANs (Local Area Networks). For many operators the upgrade path from GSM-GPRS is 3G technology. However, the GSM Association is also pushing for EDGE (Enhanced Data for Global Evolution) as an intermediate step in the migration path from GPRS and GSM systems to 3G. EDGE takes the cellular community one step closer to 3G. Like GSM, EDGE uses a combination of FDMA and TDMA as the multiple access control techniques but EDGE uses a new modulation scheme called 8-phase shift keying (PSK) to enable a more efficient use of bandwidth and as a result data rates of up to 384 kbps. The migration to 3G systems will enable mobile data transmission rates of between 384 kbps and 2 Mbps. The 3G mobile phone user will have access to high speed internet access, videoconferencing and even basic on-line video and TV services. 3G systems can use one of two international standards for its radio access technology, CDMA2000 and W-CDMA, as specified by ITU working group IMT-2000 (International Mobile Telephone). CDMA is a more advanced method for subscriber bandwidth sharing than either of the FDMA or TDMA systems used by GSM. W-CDMA is the upgrade path for operators with GSM while CDMA2000 is the migration path for the minority of operators with a cdma One legacy system.Although 3G mobile phone services will ultimately offer up to 2 Mbps in broadband data transmission capability, this bandwidth is not sufficient for 3G to be considered as a major competitor in the broadband (to the home) technology market. Mobile 3G will be a service that is used in addition to mainstream broadband services.

4. CONCLUSION

In order to remain competitive as the broadband market evolves, broadband service suppliers must have a strategy to be able to offer a triple play service at some point in the future; that is, voice, data and video. Of these three, video service is the most challenging as it requires most bandwidth. There are a myriad of fixed-line and wireless broadband solutions available, with each technology having its own merits and demerits. Those fixed-line technologies operating over existing copper, coax or power lines are bandwidth limited by the nature of the transmission medium. Free space or wireless technologies that use the radio spectrum are also bandwidth limited, but in their case, by the amount of available licensed radio spectrum. Of these, WiMAX is the most promising technology for metro-based broadband provision. However the NLOS and indoor self-install system capabilities that are necessary features to attract and reach a widespread consumer base, place significant restrictions on WiMAX's data rate and reach performance. It is an unchallenged fact that fiber as a communication medium offers almost infinite bandwidth relative to all its competitors. Fiber has other highly advantageous benefits such as a much higher level of security and reliability than copper/wireless networks provided by its immunity to electro-magnetic interference. The unsurpassed reliability of optical systems also leads to low operating costs. As consequence, direct fiber connections, to each and every home, are a very desirable concept. Up until recently, the cost of customer premise equipment (CPE) has been prohibitively high. However, the recent favorable FCC ruling, which provides competitive protection for fiber to the home (FTTH) builds in the US, has

opened up a mass market for FTTH products. The economies of scale, associated with the resultant increase in the US FTTH market size, have driven the cost of CPE equipment down to new much more affordable levels. However, FTTH network deployments still require the installation of fiber optic cables throughout the access network, and the inherent cost of such cable installation is the major concern of many operators considering FTTH deployment. Nonetheless, the ultimate bandwidth capability, high reliability, security and low operating costs of FTTH systems, coupled with the new affordability of FTTH equipment is beginning to drive further deployment of FTTH in regions of the world outside the US.

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TITLE

SMART HOME AUTOMATION AND SECURITY SYSTEM USING ARDUINO

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ABSTRACT:
With the advancement of technology and more dependency of people on smart phone and increasing demands of easy and quick way of solving Daily life task, it has become very important to have a technology which can control over the domestic and industrial applications using IOT. Our paper 'Sensing and controlling the world around using Arduino and IOT 'deals with embedded technologies along with internet of things (IOT) using Arduino which employs the embedded block and script programming for Arduino and sensors like flex sensor, accelerometer, flame sensor, magnetic sensor, WI-FI module. In this paper we present a home automation and home security technique. The sensors will be interface with Arduino. The status of our home appliances will get uploaded to a cloud platform through wireless module. Our system and mobile should be connected over same wireless network. Our sensors will be able to enable or disable the sensors which will be in control of the user. The flex sensor will depend upon the gestures of our fingers to control the appliances. The magnetic sensor will enhance door breaking security. All these data can be seen by user on the cloud platform like THINKSPEAK. This paper will serve as an example of how IOT applications can make our life easier.

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SMART HOME AUTOMATION AND SECURITY SYSTEM USING ARDUINO

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With the advancement of technology and more dependency of people on smart phone and increasing demands of easy and quick way of solving Daily life task, it has become very important to have a technology which can control over the domestic and industrial applications using IOT. Our paper 'Sensing and controlling the world around using Arduino and IOT 'deals with embedded technologies along with internet of things (IOT) using Arduino which employs the embedded block and script programming for Arduino and sensors like flex sensor, accelerometer, flame sensor, magnetic sensor, WI-FI module. In this paper we present a home automation and home security technique. The sensors will be interface with Arduino. The status of our home appliances will get uploaded to a cloud platform through wireless module. Our system and mobile should be connected over same wireless network. Our sensors will be able to enable or disable the sensors which will be in control of the user. The flex sensor will depend upon the gestures of our fingers to control the appliances. The magnetic sensor will enhance door breaking security. All these data can be seen by user on the cloud platform like THINKSPEAK. This paper will serve as an example of how IOT applications can make our life easier.

Key Words: *Arduino, Flex Sensor, Wireless Module, Flame Sensor, Internet of things (IOT) , ThinkSpeak*

1. INTRODUCTION:

Today, the increase in demand of service over the internet necessitated the data collection and exchange in efficient manner. In this sense internet of things (IOT) has promised the ability to provide the efficient data storage and exchange by connecting the physical devices via electronic sensor and internet. The IOT has created the revolution all over the world and fascinatingly it has become integral part of life. Hence, this paper utilizes Arduino fundamentals and some sensor to ease the way we control our homes appliances. This is achieved by interfacing sensors like flex sensor, accelerometer sensor, magnetic sensor, flame sensor with microcontroller based system like Arduino UNO. The values from the sensor change the status of our appliances and the status of appliances can be seen on the cloud platform..

2. Components And Software Used :

Arduino UNO, Relays, DC motor, Flex Sensor, Wi-Fi Module, Magnetic Sensor, Flame Sensor, Accelerometer, Motor Driver IC, 7805power supply, Arduino IDE, LDR (Light Dependent Resistor).

3. BLOCK DIAGRAM:

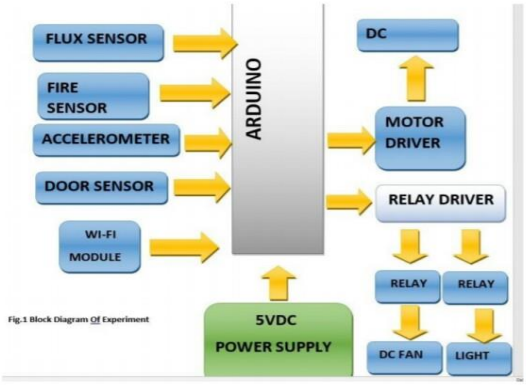


Fig.3.1.Block Diagram

4. SPECIFICATION OF COMPONENTS:

4.1.1 ARDUINO UNO BOARD:

The Arduino expansion was emerged in ITALY to build up low cost hardware for communicating design. This Arduino UNO s an excellent choice for any IOT applications design and, one can expect and carve programs according to the needs. The Arduino UNO board acts as a control unit in this experiment.

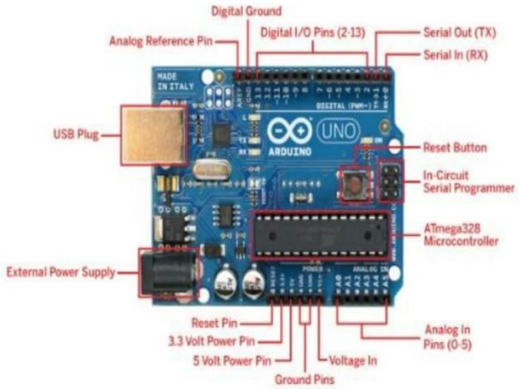
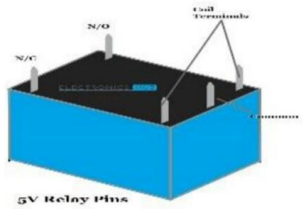


Fig.4.1.1 .ARDUINO UNO

4.1.2 5V Relays:

A relay is an electrically operated switch. Many relays use an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid-state relays. Relays are used where it is necessary to control a circuit by a separate low-power signal, or where several circuits must be controlled by



one signal.

Fig.4.1.2 .5V RELAY

4.1.3 DC Motor:

Geared DC motors can be defined as an extension of DC motor. A geared DC motor has a gear assembly attached to the motor.

Fig.4.1.3 Geared DC motor

4.1.4 FLEX SENSOR:

A flex sensor or bend sensor is a sensor that measures the amount of deflection or bending. This flex sensor is a variable resistor like no other. The resistance of the flex sensor increases as the body of the component bends. This sensor is used in our experiment to control the lightening of our house to turn it ON or off.

APPLICATION:

- *Human Machine Interface devices*

- *SecuritySystem*

Fig.4.1.4Flex Sensor

4.1.5 Wi-Fi MODULE :

The ESP8266 WiFi Module is a self-contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your WiFi network. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor.

Fig. 4.1.5 WI-FI Module

4.1.6 Reed Relay SENSOR:

The reed switch is an electrical switch operated by an applied magnetic field. In this experiment we have used this sensor to provide door breaking security. If the door breaks it will send an alert through buzzer.

Fig4.1.6 .Reed relay

4.1.7 FLAME SENSOR

A flame sensor "senses" a weak DC signal from the AC power sent to the ignitor which via the phenomenon of flame rectification in which the polarity of power sent through a flame is rectified to DC. This

sensor is used in our experiment to detect the fire in the house and then send an alert through buzzer.

Fig.4.1.7 Flame Sensor

4.1.9 ACCLEROMETER

Accelerometers are devices that measure acceleration, which is the rate of change of the velocity of an object. They measure in meters per second squared (m/s2) or in G-forces (g). The values are represented in X, Y and Z coordinates. These values are used to control the rotation of motor.

Fig.4.1.9 Accelerometer

4.2 Arduino IDE:

The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. It runs on Windows, Mac OS X, and Linux. The environment is written in Java and based on Processing and other open-source software. It runs on your computer, used to write and upload computer code to the physical board.

4.2.1 LDR (LIGHT DEPENDENT RESISTOR)

Light dependent resistors, LDRs or photo resistors are often used in circuits where it is necessary to detect the presence or the level of light. In this experiment we have used LDR to have automatic light control such that when there is brightness light is automatically OFF else it is ON

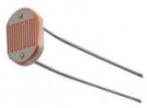


Fig. 4.2 .1 Light Dependent Resistors (LDR)

4.3 EXPERIMENTAL SETUP OF HOME AUTOMATION:

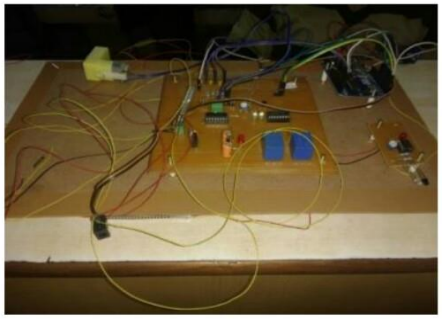


Fig. 4.3 Experimental Setup

This paper basically consists of three important parts i.e. sensing, monitoring, and controlling system. The first part sensing is done by sensors like flex sensor, accelerometer etc. the monitoring task is done by the cloud platform and the controlling part is done by our microcontroller unit i.e. is Arduino UNO. The sensors, appliances and Wi-Fi module are interfaced with Arduino UNO. The value of sensors brings a change in the status of our appliances. The flex sensor depends on the gestures of our fingers to control the appliances. The accelerometer controls the opening and closing of door. The magnetic sensor alerts us if the door lock breaks. The flame sensor alerts us if there is fire in the house. The status of our appliances are uploaded on the cloud platform and the user can see the status on his laptop and smartphone as well. The Arduino UNO controls the appliances on the basis of value given by sensors.

5. CONCLUSION:

The IOT facilitates numerous benefits to the society and from our paper we can provide and prove the strength of IOT that is capable to contribute the services for the purpose of building vast no. of applications and help to implement them on the public platform. This design provides moderate and less expensive way of sensing, monitoring and controlling system in the field of domestic and as well as industrial standard to implement IOT. At a final note, we conclude that IOT leads to become universal in every aspect. This paper will be very beneficial in our normal day to day life and will bring much needed innovation in his fast changing world of technology where people prefer to have control over things using the smartphones which will bring ease to their routine life.

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TITLE
ARDUINO BASED VIBRATION DETECTOR AND ALARM SYSTEM

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Paper presented by : G.Kalaiselvi, A.Karunya, R.Divya (students of ECE)

ABSTRACT:
In the present global situation, the combination of diverse sensors to create a clever sensor is at the rise. This paper offers with the accelerometer as a vibration detector. The fundamental awareness of this venture is to lessen the complexity of the present structures and for that reason reducing the price. The accelerometer is able to stumble on the exchange in momentum generated within the three axial planes and this belongings offers the similarly advantage in detecting the vibrations produced inside the certain subject of hobby. If the adxl335 accelerometer detects an undesired vibration in the surroundings, it will sound the alarm and make LED to blink. And hence this accelerometer can also be used as an alarm system. An effective adxl335 accelerometer is used to detect the vibrations in the surroundings. The Arduino software was used to code the programs and uploaded to the Arduino UNO board. Once the program was uploaded to the Arduino board then the accelerometer starts to detect the vibrations in the surroundings and the output can be viewed in the serial monitor. If the vibration reaches an undesired level, then it will sound the alarm and make LED to blink.

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An effective adxl335 accelerometer is used to detect the vibrations in the surroundings. The Arduino software was used to code the programs and uploaded to the Arduino UNO board. Once the program was uploaded to the Arduino board then the accelerometer starts to detect the vibrations in the surroundings and the output can be viewed in the serial monitor. If the vibration reaches an undesired level, then it will sound the alarm and make LED to blink.

Key Words: vibration, accelerometer, Arduino, monitoring, imbalance, pins

INTRODUCTION

In the present day technology of independent gadget, the development of manipulate systems is at the upward push. This calls out for better monitoring and calibration of the sensors used inside the comments of the plant, as a result growing the complexity of its circuit. This complexity in physical systems can be reduced by using the usage of better packages for correct interpretation of the information acquired.

Micro-electromechanical system (MEMS) accelerometers are widely used structures which are used to locate and degree the 3 dimensional static or dynamic forces that tend to alternate the momentum of a rigid body. This momentum results in producing vibration in that rigid body; which sometimes may be considered as 'desirable' while more often is 'undesirable' and causes loss in energy, fatigue in the system or in the system or in some cases causes fatigue in the system environment. The programs discussed in the subsequent part helps us to practically identify those undesirable vibrations while calibrating in real-life desired vibration; taking in account of the various parameters affected by temperature variations, physical parameters and so on.

In this project Arduino UNO board was used. The Arduino UNO Rev 3 is a microcontroller based on the ATmega32P with 14 digital inputs and output pins. UNO board is the very first of the Arduino forums and even though there are extra superior boards available, for this mission, the UNO board will be sufficient.

The accelerometer used on this mission would be ADXL335 small, thin, low energy, 3-axis accelerometer that includes signal conditioned voltage outputs. It has 3 analog outputs for X, Y, Z axis which require an ADC microcontroller this is supplied by using the analog capabilities of Arduino board.

BACK GROUND

The Arduino assignment began at the Interaction Design Institute Ivrea (IDII) in Ivrea, Italy. In 2003 Hernando Barragan created the development platform wiring as a Master's thesis venture at IDII, beneath the supervision of Massimo Benzie and Casey Rees, who are acknowledged for paintings at the Processing language. The task goal turned into to create simple, low-cost equipment for developing virtual initiatives by using non- engineers. The Wiring platform consisted of a published circuit board (PCB) with an ATmega168 microcontroller, an IDE primarily based on Processing and library features to effortlessly application the microcontroller. In 2003, Massimo Benzie, with David Millis, another IDII pupil, and David Cuatrilloes, delivered guide for the cheaper ATmega8 microcontroller to Wiring. But as opposed to persevering with the paintings on Wiring, they forked the mission and renamed it Arduino. Early Arduino boards used the USB-to-serial driver chip and an ATmega168. The Uno differed from all preceding boards by featuring the ATmega328P microcontroller and an ATmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to- serial converter.

I. EXPERIMENTAL SETUP

COMPONENTS REQUIRED

Arduino UNO board

Arduino is an open-source electronics platform based on easy-to-use hardware and software. It's intended for anyone making interactive projects.

Adxl335 accelerometer

The ADXL335 is a triple axis MEMS accelerometer With extremely low noise and power consumption - simplest 320uA! The sensor has a full sensing range of +/-3g.

1 k ohm resistor

A resistor is a passive two-terminal electrical component that implements electrical resistance as a circuit Detail. In digital circuits, resistors are used to reduce current waft, adjust signal ranges, to divide voltages, bias active elements, and terminate transmission lines, among other uses.

Bread board

A breadboard is a construction base for prototyping of electronics. the solderless breadboard does not require soldering, it is reusable. This makes it easy to use for creating temporary prototypes and experimenting with circuit design.

Jumper wires

Jumper wires are simply wires that have connector Pins at every quit, permitting them to be used to connect factors to each other without soldering.

Led

A LED lamp or LED light bulb is an electric light to be used in light furnishings that produces mild using mild-emitting diode (LED). LEDs use most effective about 10% of the energy an incandescent lamp requires.

Piezo alarm

A buzzer or beeper is an audio signalling tool, which may be mechanical, electromechanical, or piezoelectric (piezo for short). Typical uses of buzzers and beepers include Alarm gadgets, timers, and confirmation of user input together with a mouse click or keystroke.

9V battery

The nine-volt battery, or 9-volt battery, is a commonplace size of battery that changed into introduced for the early transistor radios. Most nine-volt alkaline batteries are built of six man or woman 1.Five V LR61 cells enclosed in a wrapper.

9V to barrel jack connector

A coaxial power connector is an electrical power Connector used for attaching more-low voltage devices inclusive of Consumer electronics to outside energy. Also known as barrel connectors, concentric barrel connectors or tip connectors, these small cylindrical connectors come in an enormous variety of sizes.USB connector to connect the Arduino UNO to the PC . Arduino use the USB port to simulate a serial port so we should use a USB cable to connect the Arduino USB port to computer USB port.

APPS AND ONLINE SERVICES

Arduino IDE

Arduino consists of both a bodily programmable circuit board (frequently known as a microcontroller) and a bit of software program, or IDE (Integrated Development Environment) that runs on your laptop, used to write and add pc code to the physical board.

ARRANGEMENT OF THE COMPONENTS

Using an adxl335 accelerometer this project sounds an alarm when the accelerometer senses an undesired vibration. This sounds alarm when the accelerometer senses the vibrations more than the desired level.

PROCESS OF CIRCUIT BUILDIND

Accelerometer has five pins and all of these are connected to Arduino.

Table 1.1 Connection of ADXL335 to the Arduino UNO

Adxl335 pins	**Arduino pins**
GND	GND
VCC	5V
X	Pin A5
Y	Pin A4
Z	Pin A3

Finally, the AREF is connected to 3.3V on Arduino to set the reference voltage of ADXL335 to 3.3V.

Then connect the positive terminal of the buzzer and the LED to the digital pin 3 in the Arduino board.

ADD A KEY

Add a key to the project. I used 9v battery. Connect the battery to the barrel jack in the Arduino board for key purpose. We can use this alarm system to the doors, lockers,

Vehicles etc. This alarm system will sound the alarm when the vibrations in the surroundings get more than the desired level. We can fix the vibrations to a level and if the sensor detects the vibration more than that level the alarm makes sound.

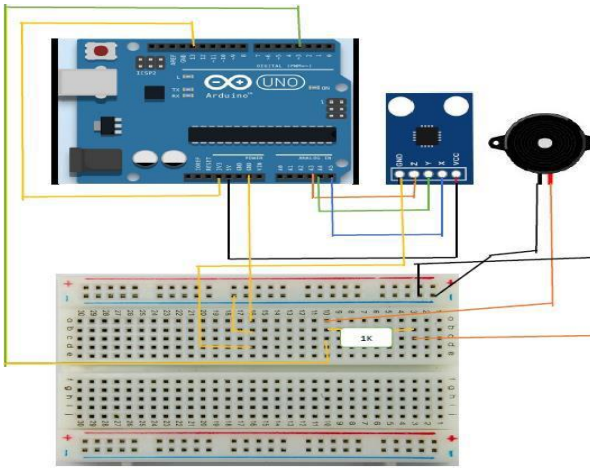

Figure.1.1 Schematic Representation of the Circuit

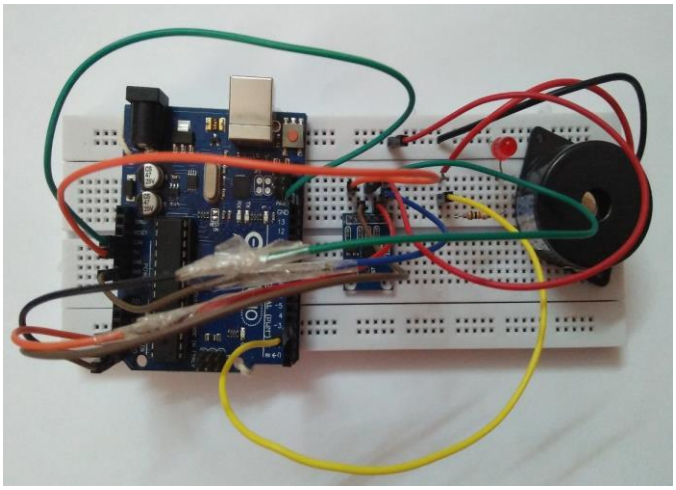

Figure.1.2 Circuit Connections

II. PROCESS OF CODING ACCELEROMETER

Before beginning the coding, the Arduino 1.8.7 software needs to be downloaded for compatible operating system.

Next the following code is put in the Arduino software.

```
const int ap1 = A5;
const int ap2 = A4;
const int ap3 = A3;
//Buzz the Alarm
const int buzzer = 3;
const int ledPin = 3;
int sv1 = 0;
int ov1 = 0;
int sv2 = 0;
int ov2 = 0;
int sv3 = 0;
int ov3 = 0;
void setup(){
  //intialize serial communications at 9600bps:
  Serial.begin(9600);
//Initialize Buzzer Pin
  pinMode(buzzer, OUTPUT);
  pinMode(ledPin, OUTPUT);
 }
void loop(){
analogReference(EXTERNAL);//connect 3.3v to AREF
  //read the analog in value:
  sv1 = analogRead(ap1);
  //map it to the range of the analog out:
  ov1 = map(sv1,0,1023,0,255);
  //change the analog out value:
  delay(2)
  //
  sv2 = analogRead(ap2);
  ov2 = map(sv2,0,1023,0,255);
  //
  delay(2);
  //
  sv3 = analogRead(ap3);
```

```
                ov3 = map(sv3,0,1023,0,255);

{
        if(analogRead(ap1)>500)
        {
                digitalWrite(3,HIGH);//turn LED/Buzz ON
                delay(100);
                digitalWrite(3,LOW);//turn LED/Buzz OFF
                delay(100);

        }
         if(analogRead(ap2)>500)
         {
                digitalWrite(3,HIGH);//turn LED/Buzz ON
                delay(100);
                digitalWrite(3,LOW);//turn LED/Buzz OFF
                delay(100);
         }

        if(analogRead(ap3)>500)
        {
                digitalWrite(3,HIGH);//turn LED/Buzz ON
                delay(100);
                digitalWrite(3,LOW);//turn LED/Buzz OFF
                delay(100);
         }
}
  //print the results to the serial monitor:
        Serial.print("Xssensor1=");
        Serial.print(sv1);
        Serial.print("\t output1=");
        Serial.println(ov1);
        Serial.print("Ysensor2=");
        Serial.print(sv2);
        Serial.print("\t output2=");
        Serial.println(ov2);
        Serial.print("Zsensor3=");
        Serial.print(sv3);
        Serial.print("\t output3=");
        Serial.println(ov3);
        delay(3000);
}
```

Here, I have fixed the minimum value of 500 as desired vibrations.

III. RESULTS AND DISCUSSION

RESULTS OF THE ACCLEROMETER VIBRATION

After the serial monitor is pressured the result should give something like this following figure

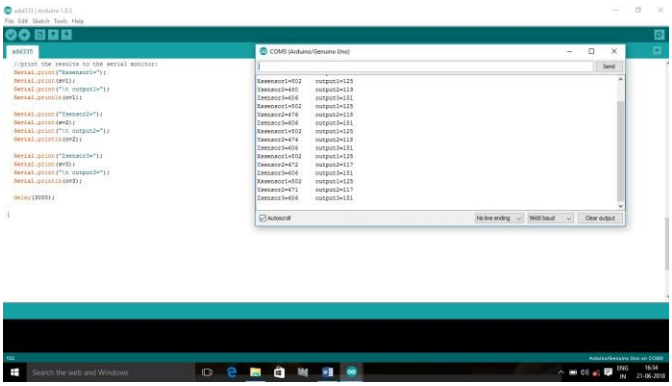

Figure.3.1 Results of the Accelerometer Vibration

Figure.3.1 shows that there are two different analog values that are output.The first one is the ADC fee in 10-bit resolution ranging from 0 to 1023 and the second is the mapped PWM value that is in 8-bit resolution ranging from 0 to 255. Then three values of X, Y. and Z are displayed at the Same time and repeated after a special c program language period inside the code. The outputs are numerous due to the fact during this measuring system, vibration was produced. It is not constant which shows that the accelerometer is detecting the vibration. If the vibrations along three axes exceeds above 500, the alarm sounds and LED blinks

IV. CONCLUSION

All in all, the Arduino board is a pretty cheaper and reliable way to program the accelerometer to detect the vibration. The hardware parts are relatively easy to build. Figure.6.1 shows that the accelerometer is sensitive enough to differentiate between output of 117,118 and119 which means the accelerometer detects even very small changes in the vibrations.

FUTURE SCOPE

As a part of the current research, an accelerometer sensor is completely designed and developed and performance Verified. However, there is scope for future studies to improve the performance and process.

- The present configuration of electrical routing can be redesigned in such a way that overall chip size and way stray capacitance can be reduced considerably.
- Scope exists for studying the temperature errors due to packaging materials & methodologies used in sensor packaging.
- The sensor design can be further improved by adding self-testing features.

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PROCEEDING OF
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Paper Code
NCHS202003154

TITLE
People Evacuation Guidance Model for Fire Hazard

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ABSTRACT:
With the development of science and technology, the design of modern architecture is becoming more and more attractive. The large-scale public buildings such as shopping malls, office buildings, Research centres and education centres are increasing dramatically. In case of sudden disasters and the overloaded electricity may easily cause fire and the fire smoke, fire in large buildings spread over a wide range of areas and produces physical damages, several hazard to life and property and atmospheric pollution. This paper proposes An Intelligent IOT based People Evacuation Guidance Model for Fire Hazard to guide the people by constructing the evacuation path dynamically based on the real time situation to reach the safety exit quickly in large public buildings using their Personal Digital Assistant like mobile phone, tabs etc. Whenever a fire breaks out, IOT module alerts the people to find the safety exit. Thus, the proposed system minimizes danger and economic losses by guiding the optimized evacuation path. The performance of the proposed system will be compared with the existing system and the result of improvement will be shown. **Keywords: Fire Detection, Internet of Things, Optimal Path, Safety Exit, Mobile Terminal.**

People Evacuation Guidance Model for Fire Hazard

Dr. Faritha Banu J[1], Yuvarani K[2], Suvetha B[3], Nyle S[4], Srilekha A[5] 1 Professor,
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Abstract: ***With the development of science and technology, the design of modern architecture is becoming more and more attractive. The large-scale public buildings such as shopping malls, office buildings, Research centres and education centres are increasing dramatically. In case of sudden disasters and the overloaded electricity may easily cause fire and the fire smoke, fire in large buildings spread over a wide range of areas and produces physical damages, several hazard to life and property and atmospheric pollution. This paper proposes An Intelligent IOT based People Evacuation Guidance Model for Fire Hazard to guide the people by constructing the evacuation path dynamically based on the real time situation to reach the safety exit quickly in large public buildings using their Personal Digital Assistant like mobile phone, tabs etc. Whenever a fire breaks out, IOT module alerts the people to find the safety exit. Thus, the proposed system minimizes danger and economic losses by guiding the optimized evacuation path. The performance of the proposed system will be compared with the existing system and the result of improvement will be shown.*** ***Keywords: Fire Detection, Internet of Things, Optimal Path, Safety Exit, Mobile Terminal.***

I. INTRODUCTION

Nowadays the drastic improvement of science and technology in the modern architecture is more complicated, and the large-scale public buildings such as office buildings, shopping malls, science and education centers are increasing and densely populated. The creative and innovative idea makes the building structure complicated [1].Incase of sudden disasters like fire, gas leakage and earthquake etc., the evacuation of people is inefficient because of ineffective evacuation guidance and anxiety conditions of people when they are under stress their behaviors can be unpredictable.

In addition, the people health status and average age which may affect the crowd dynamic movement also considered. On the other hand, large public buildings usually occupy a larger internal space and their structural design is relatively complex. The overloaded electricity may cause fire at any time [3].Building fire may cause incredible life and more property loss. Evacuating the people from the large public building in a reasonable amount of time is a challenging task. This paper proposes dynamic planning to enhance the safety of people, Items destroyed by fire, however, is gone forever. An uncontrolled fire can destroy an entire room's contents within a few minutes and completely burn out a building in a couple of hours. Serve the emergency management for urban disaster prevention and also mitigation, a spatial model for that will be established and used for an emergency evacuation platform is designed based on IOT technology.

i. MOTIVATION

The complexity and variability of the internal environment of public buildings prompt to think about how to protect people in the fire and quickly reach the safe area.

ii. SCOPE

The scope of this project is to guide the people by constructing the evacuation path dynamically based on the real time situation to reach the safety exit quickly in large public buildings using their Personal Digital Assistant like mobile phone, tabs etc.

iii. OBJECTIVE

1. To propose an intelligent people evacuation guidance model for fire hazard in large buildings.
2. To protect the safety of life and property in large public buildings under fire conditions.
3. To propose an optimal path to reach the safety exit quickly.

II. LITERATURE SURVEY

The study of fire evacuation requires considering the integrity of function, personnel behaviors, the rationality of the deployment of firefighting equipment and the form of the fire site, the building structure and other factors. Some of the study should be taken to develop that fire evacuation model.

In 2019, Huixian Jiang introduced fire evacuation model to guide the people by constructing evacuation path dynamically based on the real time situation to reach the safety exit using all possible paths in large public buildings with the help of their Personal Digital Assistant like mobile phone, tabs etc. In order to increase the safety evacuation in public places, using the Ant Colony Algorithm is used [4].

Pejman Kamkarian and Henry Hex moor proposed the method for Predicting Evacuation Capacity in Public Buildings and demonstrated a solution for analyzing public space evacuation rates. For evacuating from a building in a reasonable amount of time and to increase the safety evacuation in public spaces, the Bayesian Belief Network method was developed [2]. That methodology utilized physical Environment and Crowd Properties, Physical Properties, Crowd Properties and Network topology to construct Bayesian Belief Network. The limitation of this paper is for the complex building structure, the process is very difficult and time consuming.

In 2017, Swaranadeep Majumder introduced the IoT based fire emergency monitoring and evacuation system that can be used as a smart fire defense guidance system.

The goal is to inform occupants and emergency services of the location of the fire and provide a real time safe path of evacuation. To achieve the safe system, the Heuristic algorithm of the Capacity constrained Route Planner (CCRP) Methodology is utilized [5]. Jianyong Shi [6] proposed agent technology to simulate and analyze the process of occupant's evacuation under fire expansion. As a real time, example, they have simulated their model in indoor stadium where 2008 Beijing Olympic Games is conducted. Also expressed a methodology to study the mutual relationship between people safety and fire hazard.

Yinchuan [7] analyzed that evacuation time is increased as the number of occupants, obstacle on the stair on each floor is increases and studied the performance on doubleflight staircase compared with staircase of bifurcated type. sprinkler system activation modes is investigated by using CFD simulation software FDS in large commercial building and it was found that combustible materials, combustion rate play result in a prolonged evacuation time and affect the safety level of people in such buildings [8].

Adjiski proposed a prototype model based on fire risk assessment, fire detection, safety situation awareness, and effective system for evacuation. The application program interfaces for solving the problems of building the effective fire safety system is deployed on smartphone device that utilizes the two-way communication and 3D visualization with evacuation guidance [9].

III. PROPOSED SYSTEM

The proposed fire evacuation system produces the navigation routes using Wi-Fi. Temperature sensor is used to sense the presence of fire in buildings. The navigation routes can be monitored by peoples using webpage.

Entire system will be controlled by using PIC microcontroller. Wireless transceiver is used for communication between floors. When fire is detected in any of the floors safer exit path will be displayed in webpage. Peoples can follow that path and can be move from fire region. The architecture of the proposed system is shown in Fig.1.

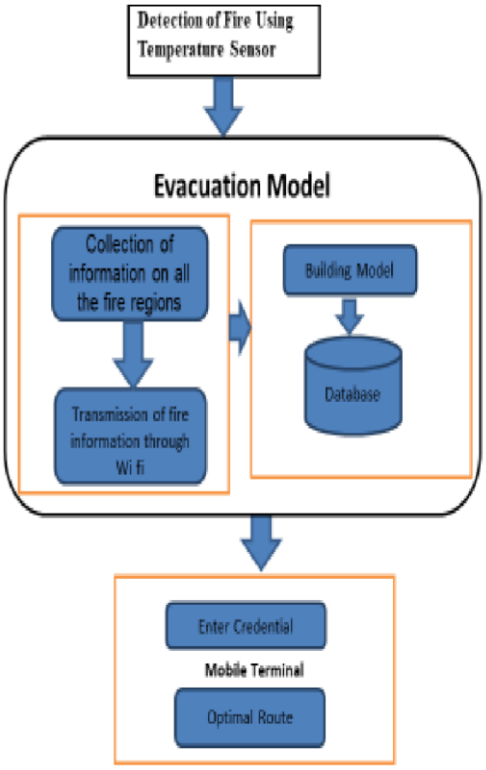

Fig.1. *System Architecture*

IV. HARDWARE COMPONENTS

A. PIC MICROCONTROLLER

Microcontroller is a single chip that contains Processor, Non-Volatile memory, Volatile memory, I/O Control unit and clock. Billions of microcontroller units are embedded in large number of products. PIC microcontroller chip is the world's smallest microcontroller. Peripheral Interface Controller (PIC)was designed by General Instruments. The main reason for using PIC is Low Power, Reasonable Size, Convenient Packaging and Surface Mount. It has High Performance RISC CPU with high operating speed and Interrupt capability. In addition, it also has Power-on Reset (POR), Power-up Timer (PWRT), Oscillator Start-up Timer (OST), and Brown-out Reset (BOR) with software control option. Microcontroller provides Programmable code protection. The ADC is used to convert Analog to digital signal.

B. WIRELESS TRANSCEIVER

A transceiver is a device comprises both a transmitter and a receiver. It shares a common circuitry. The device is a transmitter-receiver when no circuitry is common between transmit and receive functions.

C. SWITCHED MODE POWER SUPPLY

Switched Mode Power Supply is a power supply which uses a switching regulator to control then stabilize the output voltage by switching on and off the current load.

D. WIFI MODULE(ESP8266)

ESP8266 which is suitable for adding Wi-Fi functionality to microcontroller via UART. The module can be reprogrammed to act as a standalone Wi-Fi connected device. It has 8 pins, which has 4 in the row of 2. These are the pins for communication. Controller or USB to serial converters work at 5V**.**

E. TEMPERATURE SENSOR

The lm35 is an integrated circuit sensor which is used to measure the temperature with an electrical output propositional to the temperature. Output voltage is linearly propositional to the Celsius temperature. The given formulae are used to convert the Celsius into voltage.

$At\ 25°C$

$$Vout = \frac{X_2}{X_1 + X_2} yV = \frac{1000}{10000 + 1000} y12V = 1.09V$$

$At\ 100°C$

$$Vout = \frac{X_2}{X_1 + X_2} yV = \frac{1000}{100 + 1000} = y12V = 10.9V$$

Vout is the Negative Temperature Coefficient. Let the conductor having resistance of X2 at 1000’C and x1 at T’C respectively. The 12V is the output of SMPS module.

F. LIQUID CRYSTAL DISPLAY

A **16x2 LCD** displays 16 characters per line and there are two such lines. In this each character is displayed in 5x7 pixel matrix. This LCD has 2 registers that are Command and Data. The command register holds the command instructions given to the LCD to do a predefined task like initializing it, clearing etc.

V. HARDWARE IMPLEMENTATION

The 230V AC Power supply is converted to 12V DC through SMPS. In SMPS the input Voltage is passed to the bridge rectifier which converts the ac input to dc, the output from bridge rectifier is stored in the capacitor, the flow is passed to the resistor to ignore the reverse back voltage. The Pulse set transformer or step-down transformer receives the input and convert it into 12V DC supply. Zener diode is used to maintain the consistency of voltage. The 12V DC is given as input to the 7805 regulator which converts the input into 5V DC. The LM35 is a temperature sensor which operates over a −55˚ to +150˚C temperature range, while the LM35C is rated for a −40˚ to +110˚C range (−10˚ with improved accuracy). The LM35 sense the temperature and displays the degree of temperature in LCD. In LCD the sensed temperature information is stored in data registers. When the value exceeds the threshold limit then abnormal status is updated via LCD. The transceiver placed in the controller is used to transmit and receive information between floors. The Wi-Fi module works with 3.3V, the TTL (Transmitter-Transmitter Logic) helps to convert the required voltage. The output of Wi-Fi module is given to the webserver for generating the safety path.

VI. SOFTWARE IMPLEMENTATION

The compiler has built in functions to access the PIC microcontroller hardware such as READ_ADC to read a value from the A/D converter. The CCS Compiler is used to program the PIC microcontroller. The Visual studio IDE (integrated development environment) is used for creating the webpage. The safety path is generated by placing the building map in the database. During the execution of the program the building map is retrieved by using SQL (Structured Query Language).

VII. WORKFLOW

Temperature sensor is used to sense the presence of fire in buildings and that information send to microcontroller unit. Microcontroller unit controls the entire system. When the temperature exceeds the threshold limit it notifies the presence of fire through LCD. RFM transceiver is used to transmit and receive the information form Floor1 and Floor 2 microcontroller unit. Fire hazard information is updated in web server via Wi-Fi. The block diagram is shown in fig.2.

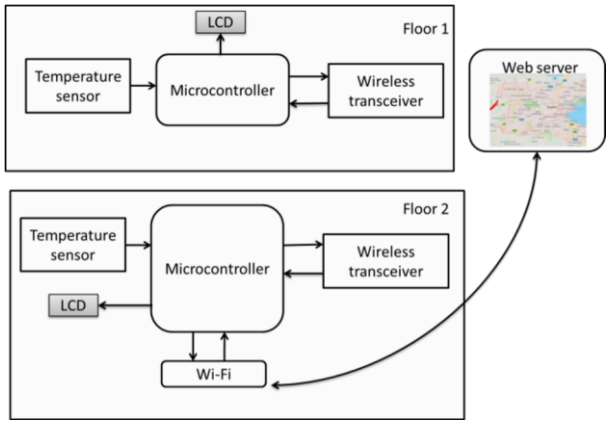

Fig.2. *Block Diagram*

VIII. ESTABLISHMENT OF EVACUATION MODEL

The internal structure of the building is shown in figure

3. and the floor plan is shown in figure.4. According to the actual floor structure, the shopping mall, the floor plan of the shopping mall is divided into 5 areas are shown in fig. 4. There are too many areas in the floor plan they are A1, A2, A3, A4 and A5. We consider only the A1 areas. The A1 area contains two floors they are floor 1 and floor 2. The evacuation path is generated based on the fire region in the floors.

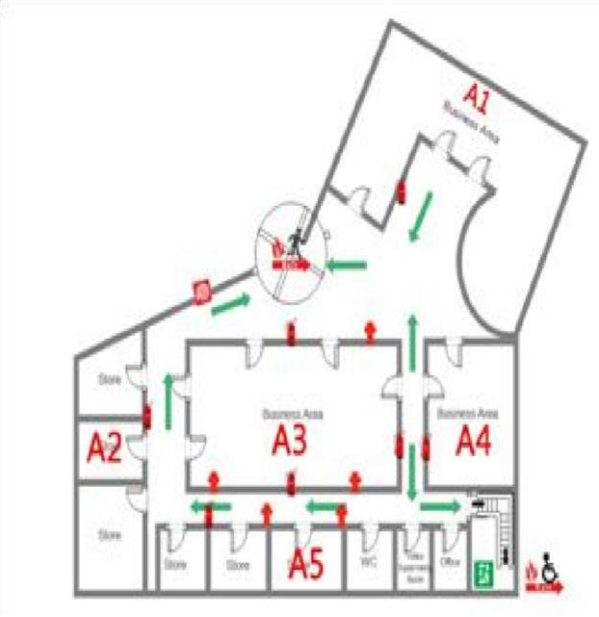

Fig.3. *Building Plan*

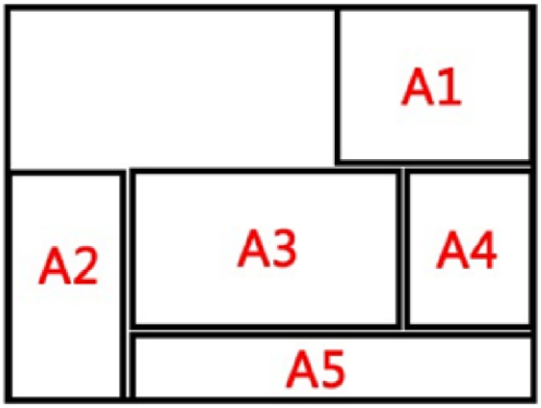

Fig.4. *Plan Zoning Map*

IX. DESIGN OF MOBILE TERMINAL

The mobile terminal of intelligent fire evacuation prototype system for large public buildings is implemented based on the construction of indoor maps. In order to display the layered building map in a window as large as possible on the mobile terminal, the menu bar is arranged in the form of sideslip. The buttons set in the menu bar mainly include nearby environment, optimal route. The function of the system relates the routine operation of layered map, such as zooming, translation and so on. The Layout of the Login Page, Dashboard and safety path shown in Fig.5, Fig.5.1, Fig.5.2 respectively.

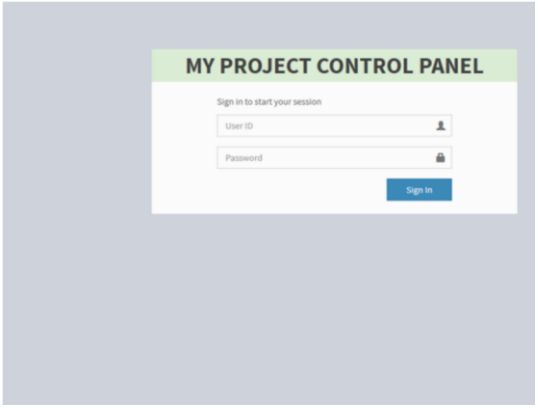

Fig.5. *Login Page*

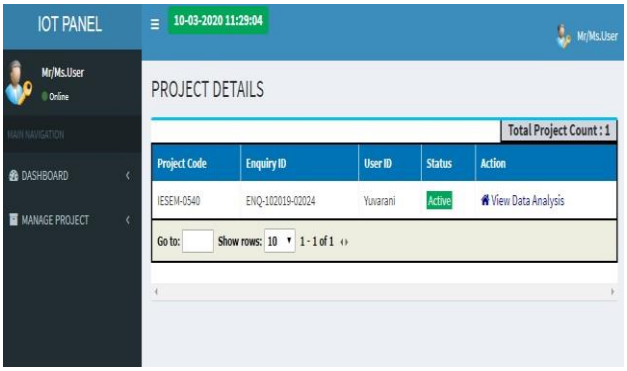

Fig.5.1. *.Dashboard*

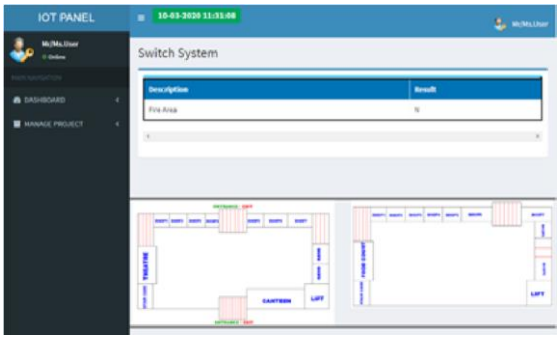

Fig.5.2. *Safety Path*

X. RESULTS AND DISCUSSION

Consider the building plan in fig.3. The fire in the way to reach the exit, the webpage shows the optimized path to reach the safer exit. Even fire in the optimized path the web page shows the alternate path. In fig.6 shows the building route map for path 1 and fig.7 shows the average path rate of path 1. In fig.8. Shows the building route map for path 2 and fig.9. Shows the average path rate of path 2.

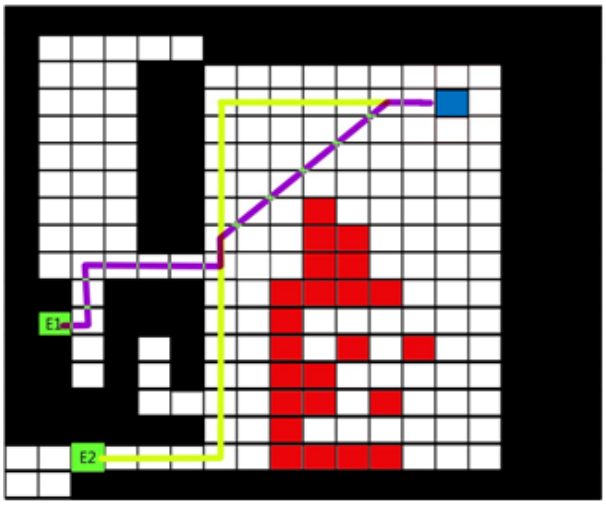

Fig.6. *Building Route Map (Path 1)*

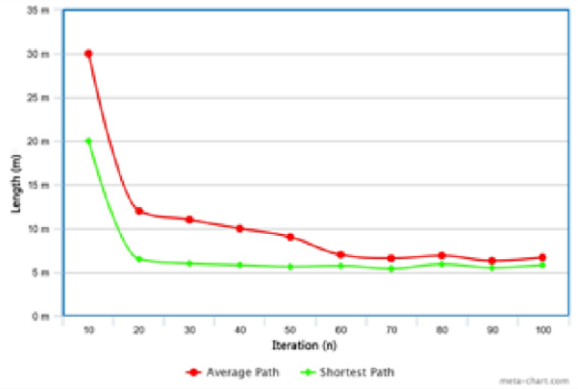

Fig.7.*Average path rate (Path 1)*

Consider the building route map in fig.6 the red coloured region shows the fire location. E1 and E2 are the safety exit. When fire breaks out in any of the floors, based on the fire location the path is generated to reach the nearest safety exit. In other case, if fire occurs in both the floors, obtain the fire location and generate the optimised path to reach the safety exit.

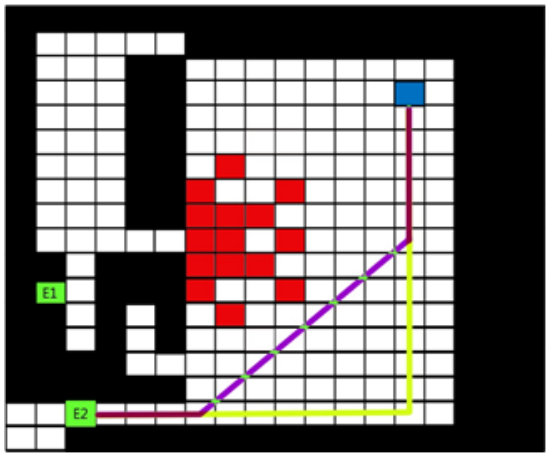

Fig.8. *Building Route Map (Path 2)*

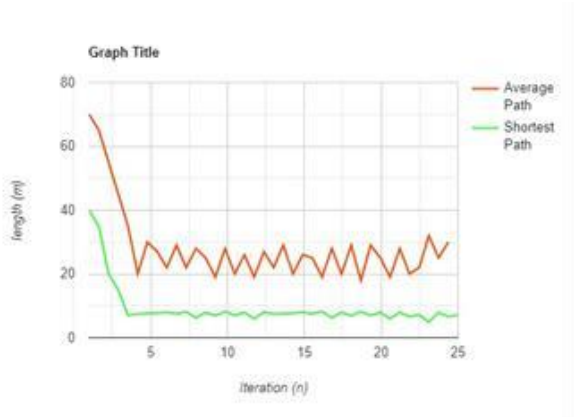

Fig.9. *Average path rate (Path 2)*

The time taken to reach the safety path is very less when the fire breaks out in any of the floors. When fire occurs, the distance to reach the safety exit is large when compared with the actual distance to reach the safety exit.

XI. CONCLUSION

The proposed system is used to reduce the number of deaths in fire hazards by introducing IOT. In this project, temperature sensor is used to sense the presence of fire in floor 1 and floor 2 that information will be updated in web server via Wi-Fi. When fire is detected in any of the floors safer exit path will be displayed in webpage.

XII. FUTURE SCOPE

The Evacuation System can be further enhanced to provide the Mobile Application to the user who already installed in their mobile Terminal instead of entering the URLs of the website to get the safety path.

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TITLE

IOT BASED WATER QUALITY MONITORING SYSTEM

ABSTRACT:

The conventional method of testing water quality is to gather samples of water manually and send to the lab to analyse. This method is time consuming and wastage of man power and not economical. The Water quality measuring system that we have implemented checks the quality of water in real time through various sensors (one for each pH parameter: pH conductivity, temperature, turbudity) to measure the quality of water. As a variation in the value of this parameter points towards the presence of pollutants. The Wi-fi module in the system transfers data collected by the sensors to the microcontroller, and transfers data to the smart phone/PC. This system can keep a strict check on the pollution of the water resources and be able to provide an environment for safe drinking water.

Keywords: Waterquality, pH, Conductivity, Temperature, Turbidity, IOT, Wi-fi(ESP8266)

 ISBN: 978-93-5406-440-1

INTERNET OF THINGS BASED WATER QUALITY MONITORING SYSTEM

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Department of Electronics & Communication Vels University, Chennai, Tamilnadu, India

ABSTRACT

The conventional method of testing water quality is to gather samples of water manually and send to the lab to test and analyze. This method is time consuming, wastage of man power, and not economical. The water quality measuring system that we have implemented checks the quality of water in real time through various sensors (one for each parameter: pH, conductivity, temperature, turbidity) to measure the quality of water. As a variation in the value of this parameter points towards the presence ofpollutants. The Wi-fi module in the system transfers data collected by the sensors to the microcontroller, andtransfers the data to the smart phone/PC. This system can keep a strict check on the pollution of the water resources and be able to provide an environment for safe drinking water.

Keywords:-Waterquality,PH,Conductivity,Temperature,Turbidity,IOT,Wi-fi(ESP8266).

I. INTRODUCTION

Water is one of the most essential natural resource that has been gifted to the mankind. But the rapid development of the society and numerous human activities speeded up the contamination and deteriorated the water resources. For above water quality monitoring is necessary to identify any changes in water quality parameters from time-totime to make sure its safety in real time. The Central Pollution Control Board (CPCB) has established a series of monitoring stations on water bodies across the country which monitor the water quality on either monthly or yearly basis. This is done to ensure that the water quality is being maintained or restored at desired level. It is important that it is monitored on regular basis. Water quality monitoring helps in evaluating the nature and extent of pollution control required, and effectiveness of pollution control measures. CPCB has plans to establish water quality monitoring network across Ganga river basin. All the stations will operate in real time and central station can access data from any of the above stations using GPRS/GSM or 3G cellular services. State pollution boards and CPCB zonal offices can also access data from central station. Large amount of data can help to take right decisions and also to implement in time accordingly [1],[2]. Cost of the system depends on number of parameters to be measured. Water quality monitoring systems need to quickly identify any changes in the quality of water and report the same to the officials for immediate action. The system is designed for continuous onsite sensing and real time reporting of water quality data where the officials can access the data on the smart phone/PC through Internet. Our proposed system employs use of multiple sensors to measure the parameters, measures the quality of water in real-time for effective action, and is economical, accurate, and required less manpower. In this paper section 2 discusses about literature survey on water quality monitoring while section 3 discusses on Internet of Things. Section 4 discusses implementation of water quality monitoring system, and results obtained through the system are discussed in section 5. Section 6 concludes the paper.

II. LITERATURE SURVEY

The available water resources are getting depleted and water quality is deteriorated due to the rapid increase in population and need to meet demands of human beings for agriculture, industrial, and personal use. The quality of ground water is also affected by pesticides and insecticides. The rivers in India are getting polluted due to industrial waste and discharge of untreated sewage. In order to eliminate problems associated with manual water quality monitoring, CPCB has planned to go hi-tech and plans to establish 'Real Time Water Quality Monitoring (WQM) Network' across Ganga Basin. Stephen Brosnan, 2007 [3] investigated a wireless sensor network (WSN) to collect real time water quality parameters (WQP). Quio Tie-Zhn, 2010 [4] developed online water quality monitoring system based on GPRS/GSM. The information was sent by means of GPRS network, which helped to check remotely the WQP. Kamal Alameh, 2011[5] presented web based WSN for monitoring water pollution using ZigBee and WiMAX networks. The system measured various WQP. It collected, processed measured data from sensors, and directed through ZigBee gateway to the web server by means of WiMAX network to monitor quality of water from large distances. System was capable of monitoring water pollution in real time. Dong He, 2012 [6] developed WQM system based on WSN [7]. The remote sensor was based on ZigBee network. WSN tested WQP and sent data to Internet using GPRS. With the help of Web, information was gathered at remote server. Kulkarni Amruta, 2013 [8] created solar powered WQM utilizing remote sensor network. The Base station (BS) gathered information from distant remote sensors. The BS associated with ZigBee module was powered by sunlight baseboard (Energy harvesting).

III. INTERNET OF THINGS

Internet of Things (IoT) is defined as the network of physical objects/things - devices, vehicles, buildings embedded with sensor, micro-controller, and network connectivity that enables these objects to collect and exchange data. The IoT can be described as a huge web of embedded objects designed with built-in wireless technologies such that they can be monitored, controlled and linked within the existing Internet infrastructure. Each device has a unique identification and must be able to capture real-time data autonomously. Basic building blocks of IoT consist of sensors, processors, gateways, and applications. It is estimated that by 2020, 50 billion 'things' will be connected to the Internet [9]. Wireless technologies such as the Wi-Fi, Bluetooth, ZigBee, RFID, 6LoWPAN (IPv6 Low power Wireless Personal Area Network) allow the device to be connected to the Internet and to each other. The cloud services collect, store and analyze the data collected by the sensors and allow people to take decision accordingly

Mobile data management applications are being increased because of the rapid spread of mobile phones. Smart phones now has become platform both for computing and communication. Mobile phones are becoming cheaper, easier to use, and can be used for multiple types of information transmission. The mobile data applications along with sensor technology can improve the efficiency as well as accuracy of the data reporting for water quality monitoring system. Smart phones/tablets having sensors embedded with display and keypad can be connected to the Internet with an IP address (satisfies every requirement of an IoT device). They will serve as the hub/remote control for IoT. In Ubiquitous Network Architecture smart things are part of the Internet; authorized users have access to information; servers act as a sink to collect data from each object.

HTTP over Internet. One can create applications like sensor logging, location tracking, and social network of things with status updates with the help of ThingSpeak [10]. API of ThingSpeak permits processing of numeric data like averaging, median, summing, rounding and time scaling.

ThingSpeakchannel supports 8 data fields, elevation, latitude, longitude, and status. ThingSpeak can send sensors data to cloud to store data in a channel using sensors and websites. Cloud provides easy access to the stored data. ThingSpeak channel data now can be

analyzed, visualized, can calculate new data, or interact with web sites and social media. With this one can calculate new data, and visualize data in the form of plots, charts, and gauges using analytical tools online. ThingSpeak can access MATLAB to provide sensor data. It uses tools for devices to communicate for actions. One can react both to raw data and new data in a channel and also can help devices to execute by queuing the commands.

IV. IMPLEMENTATION

This system makes use of three sensors (pH, conductivity, turbidity, temperature), processing module microcontroller, Thefour sensors capture the data in the form of analog signals. The ADC converts these signals into the digital format. These digital signals are sent to the microcontroller via a Wifi module.

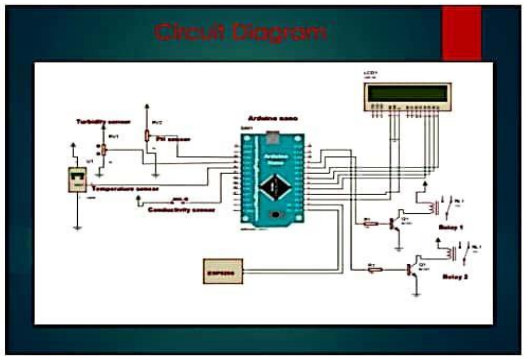

Figure 1. Water Quality Implementation System

The microcontroller will process the digital information, analyze it, and further communication is done by the Wifi module, which sends an Information with the water quality parameters onto the smart phone/PC, which also displayed on the LCD of the micro controller. Fig. 1 shows the water quality monitoring system. Microcontroller accepts and processes the data collected from the sensors to the Web page via Wi-Fi module. This is carried out with the help of coding. The code is written in Embedded-C and using the Arduino software to simulate the code.

A. ThingSpeak

ThingSpeak is an IoT applications open source (OS) which can store and retrieve data from sensors or things using Local Area Network (LAN) or

System Design

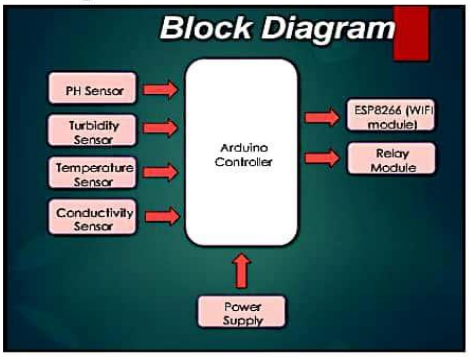

Figure 2. Water Quality Monitoring System

The water quality monitoring system shown in Figure 2 employs sensors to collect the data (parameters: pH, temperature, Electric Conductivity (EC). This data is processed through the LPC2148 microcontroller module and transferred via the ESP8266 Wi-Fi data communication module to the central server. This data can be accessed by the authorized users by logging into their accounts using a User ID and password to view data. The data is collected, processed, analyzed, and transmitted and displayed all in real time.

The Arduino Uno microcontroller is based on real time emulation and embedded trace support. It supports embedded high speed flash memory. Due to its low power consumption and small size, it is good to use where size is a key requirement for access control and point-of-sale applications. It is suitable for gateways and protocol converters in communication, soft modem, voice recognition, low resolution imaging, and provides high processing power and large buffer size [11]. The ESP8266 is a low cost Wi-Fi module consists of Wi-Fi chip with full TCP/IP stack and micro controller chip manufactured by M/S Espruino [12]. Above module is a WLAN network, which hosts the applications or offload WiFi

network functions from other application processor. During hosting the applications it boots up directly from external flash. Performance of the system is improved and memory requirement is also minimized because of its integrated cache. Wireless Internet access can be introduced to any microcontroller based design using CPU AHB bridge interface or UART interface when Wi-Fi module works as Wi-Fi adapter.

ESP8266 uses serial transceiver (Tx/Rx) to send and receive data in Ethernet buffers, and serial commands to query and change configurations of the Wi-Fi module. It only requires two wires (Tx/Rx) to communicate between a microcontroller and Wi-Fi module. It offloads Wi-Fi-related tasks to the module, allowing the microcontroller code to be very light-weighted. Wi-Fi Module is addressable over SPI and UART, making it easy to build an Internet of Things application. We use AT commands to connect to Wi-Fi networks and open TCP connections without need to have TCP/IP stack running in our own microcontroller. By just directing connecting the microcontroller to this module, we can start pushing data up to the Internet (Central server).

A. Sensors

A sensor is a transducer device to detect events or changes in its environment, and then provide a corresponding electrical output. The most important characteristics of a sensor are precision, resolution, linearity, and speed. Sensor calibration improves the sensor performance. The performance can be enhanced by removing structural errors in the sensor outputs. Structural errors can be find out by taking difference between sensor's measured output and its expected output. Above repeatable errors calculated during calibration are compensated in real time during measurements carried out by sensors.

1) pH Sensor pH is a measure of how acidic or basic alkaline the water? It is defined as the negative log of the hydrogen ion concentration. The pH scale is logarithmic and goes from 0 to 14. The pH term translates the values of the hydrogen ion concentration. It is low for acidic and high for alkaline solutions. A natural source of water pH is around 7. For each increase in number of pH, the hydrogen ion concentration decreases ten-fold and water becomes less acidic. A pH sensor has measuring electrode and a reference electrode. A battery positive terminal connected to the measuring electrode and negative terminal to the reference electrode. The reference electrode provides fixed potential and when pH sensor immersed in the solution, the reference electrode does not change with changing hydrogen ion concentration.

2) Electric Conductivity Sensor

Salts dissolve in water breaks into positive and negative ions. Dissolved ions are the conductors and conductivity is the ability of water to conduct an electrical current. The major positively charged ions are sodium, calcium, potassium, and magnesium and the major negatively charged ions are chloride, sulfate, carbonate, and bicarbonate. Nitrates and phosphates are minor charged ions to the conductivity. Electric conductivity is measured with the help of a probe and a meter. The probe consists of two metal electrodes spaced 1 cm apart (unit: mili- or micro-Siemens per cm). A constant voltage is applied across electrodes. The current flow through the water is proportional to the concentration of dissolved ions in the water, which measures the electrical conductivity.

3) Turbidity Sensor

Turbidity is the quantitative measure of suspended particles in a fluid. It can be soil in water or chocolate flakes in your favorite milk shake. While chocolate is something we so want in our drinks, soil particles are totally undesired. Keeping aside the potable purposes, there are several industrial and household solutions that make use of water in some or other manner - for instance, a car uses water to clean the windshield, a power plant needs it to cool the reactors, washing machines and dish washers depend on water like fish.

4) Temperature Sensor

An analog temperature sensor is easy to explain,it's a chip that tells you what the ambient temperature is.These sensors use a solid-state technique to determine the temperature.That's to mention,they don't use mercury(like previous thermometers),bimetallic strips(like in some home thermometers or stoves),nor do they use thermistors(temperature sensitive resistors.)Instead,they use the actual fact as temperature will incease; the voltage across a diode will increase at an acknowledged rate. Technically, this is actually the voltage drop between the base and emitter-the Vbe- of transistor. By exactly amplifying the voltage change,it is simple to generate an analog signal that is directly proportional to temperature. In this,we are using LM35 sensor.

B. Working with ThingSpeak Getting started :

- ✓ Sign-up to create a new account in ThingSpeakx Create a new channel to store the data from sensors x ThingSpeak has a 'status update field' to send any additional information required on the page.
- ✓ Give the field names: pH, Temp, conductivity, TDS x If you check 'public', other people can access your data
- ✓ Click on 'Save channel' An API key is created. An application programming interface (API) key is a code passed in by computer programs calling an API to identify the calling program (its developer, or its user to the Web site.)

Sending data to Thing Speak channel

- ✓ Chrome Poster- a developer tool that allows us to interact with the http server ✓ Copy the URL provided in Poster Enter 'key=APIkey&pH=3.5' in the 'Content body'.
- ✓ This will put the data (3.5) into the pH field Click on 'Post'
- ✓ If everything is successful, ThingSpeak API status will be '200 OK'.
- ✓ We can keep adding any number of values. The status window shows the number of values.
- ✓ Select 'View Charts' to create a chart out of the data sent to ThingSpeak channel.
- ✓ Through 'Embed code' given at the bottom of the window, we can give other people access to the channel.
- ✓ Data importing from the sensors, and then exporting the data onto the channel, all takes place in real-time basis.

V. RESULTS

Authorized users can access data by logging on ThingSpeak website as shown in Fig. 3. On entering the registered user ID and password, it goes to the web page where the parameters are displayed in real-time in the form of plots.

Figure 3. Data Logging on ThingSpeak

To demonstrate the quality of water, the pH sensor and EC sensor is put into a container filled with tap water, to which 34 drops of acid is added. From the graphs in Fig. 4 shown below, we can see that the pH of the water remains at around 3 to 4.5 means the water is acidic in nature. The temperature of the surrounding stays between 32 to 34 degrees. The conductivity of water is at 7 to 9 microSiemens/centimeter. Total Dissolved Solids are 0.67*electrical conductivity which can be measured from the graph.

VI. CONCLUSIONS

The low cost, efficient, real-time water quality monitoring system has been implemented and tested. Through this system, the officials can keep track of the levels of pollutions occurring in the water bodies and send immediate warnings to the public. This can help in preventing diseases caused due to polluted water and presence of metals. Quick actions can be taken to curb extreme levels of pollution like in the case of the Ganga and Yamuna rivers. The system can be easily installed, with the base station kept close to the target area, and the task of monitoring can be done by less-trained individuals.

Internet of Things (IoT) and its services are becoming part of our everyday life, ways of working, and business. There is a great deal of research on developing crucial building blocks and models for the next generation Internet services supported by a plethora of connected things.

VII. ACKNOWLEDGEMENT

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TITLE

INTEGRATED MULTI-PURPOSE FIELD SURVEILLANCE ROBOT FOR MILITARY USE

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ABSTRACT:

Surveillance robots are remotely controlled robots, equipped with a camera, transmitting video data to the intervention troop. They are made to small and compact enough to simply transport. In this paper, the project supposes a movable spy robot with a remote controller by using Raspberry pi and Smart Phone. The spy robot is made up of a wireless camera, Metal detector, Motion detector, Sample collector, batteries and four movable wheels. CCD camera is employed to capture information surrounding the robot. A live video it can be transmitted to the smart phone to view user command. To use the Spy robot in the dark area as night, the CCD is set up with night vision camera that connected to raspberry pi.

Wireless remote system for transmitting and receiving wireless logic signals to regulate the motors of the Spy robot system. The Four Brush DC motors and the two L293D are involved in Remote Operated Surveillance Robot. Motion detector is used to detect motion of human by 360 deg. Metal detector is used to detect the mine in a field and it gives the alert to a troop. Sample collector is mainly used to collect sample from the ground. L293D are used to drive the Brush DC motors respectively. In this paper, Remote Operated Spy Robot may be a small robot designed for spying, surveillances and inspection purposes.

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INTEGRATED MULTI-PURPOSE FIELD SURVEILLANCE ROBOT FOR MILITARY USE

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***Abstract*- Surveillance robots are remotely controlled robots, equipped with a camera, transmitting video data to the intervention troop. They are made to small and compact enough to simply transport. In this paper, the project supposes a movable spy robot with a remote controller by using Raspberry pi and Smart Phone. The spy robot is made up of a wireless camera, Metal detector, Motion detector, Sample collector, batteries and four movable wheels. CCD camera is employed to capture information surrounding the robot. A live video it can be transmitted to the smart phone to view user command. To use the Spy robot in the dark area as night, the CCD is set up with night vision camera that connected to raspberry pi. Wireless remote system for transmitting and receiving wireless logic signals to regulate the motors of the Spy robot system. The Four Brush DC motors and the two L293D are involved in Remote Operated Surveillance Robot. Motion detector is used to detect motion of human by 360 deg. Metal detector is used to detect the mine in a field and it gives the alert to a troop. Sample collector is mainly used to collect sample from the ground. L293D are used to drive the Brush DC motors respectively. In this paper, Remote Operated Spy Robot may be a small robot designed for spying, surveillances and inspection purposes.**

***Index Terms*-Raspberry pi, CCD camera, L293D, spy robot**

I. INTRODUCTION

Robot could also be a quite machine that performs very complex & several tasks by the instructions that's stored on a programmable device automatically or by giving instructions externally. It needs an interfacing device like Wi-Fi, Bluetooth, and ZigBee etc. for external controlling. During this work our concern is to make a spy robot i.e. such sort of

robot which will remain hidden and do the work without notifying any person performed using motors or with another actuators.

When the user controls by remote controller, the spy robot will move to desired destination and spy images around the robot during this project.

This robot isn't quite huge one and designed to be easy transportation. The diagram of remote operated spy robot is shown in figure 1;

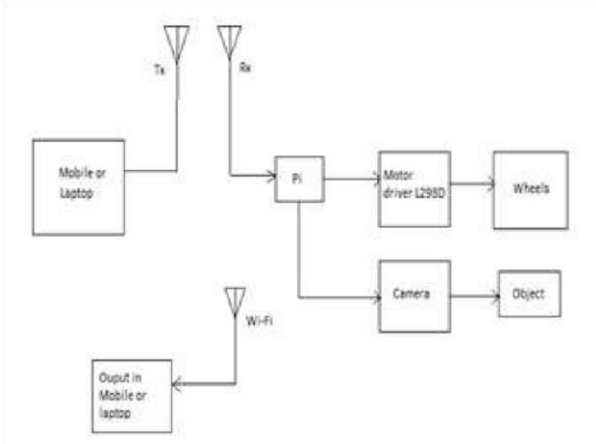

Figure 1: Overview Block Diagram of the System

II. SYSTEM COMPONENTS

A. Raspberry pi:

The Raspberry Pi is small single-board computers developed within the United Kingdom by the Raspberry Pi Foundation to plug teaching of basic computing in schools and in developing countries. the first model became much more popular than anticipated, selling outside its target marketplace for uses like robotics. It now's widely used even in research projects, alike for weather checking, due to its low-cost and portability. It doesn't include peripherals (such as keyboards and mice) or cases. However, some accessories are included in several official and unofficial bundles.

The organization behind the Raspberry Pi consists of two arms. The first two models were developed by the Raspberry Pi Foundation. After the Pi Model B was released, the inspiration found out Raspberry Pi Trading, with Eben Upton as CEO, to develop the third model, the B+. Raspberry Pi Trading is responsible for increasing the technology while the inspiration is a tutorial charity to plug the teaching of basic computing in schools and in developing countries

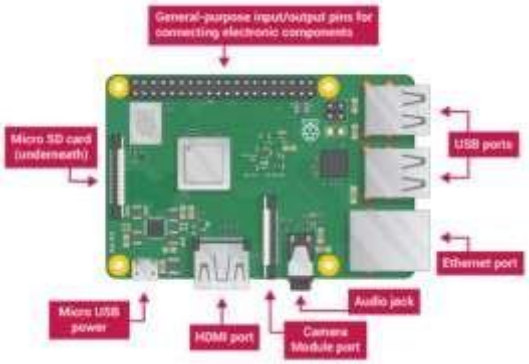

Figure 2: Raspberry Pi

B. L293D Motor Driver

It works on the concept of H-bridge. H-bridge may be a circuit which allows the voltage to be flown in either direction. As you recognize voltage got to change its direction for having the ability to rotate the motor in clockwise or anticlockwise direction, hence H-bridge IC are ideal for driving a DC motor.

In a single L293D chip there are two h-Bridge circuit inside the IC which may rotate two dc motor independently. Due its size it's considerably utilized in robotic application for controlling DC motors. Given below is that the pin diagram of a L293D motor controller.

There are two Enable pins on l293d. Pin 1 and pin 9, for having the ability to drive the motor, the pin 1 and 9 got to be high. For driving the motor with left Hbridge you would like to enable pin 1 to high. And for right H-Bridge you would like to form the pin 9 to high. If

anyone of the either pin1 or pin9 goes low then the motor within the corresponding section will suspend

working. It's like a switch.

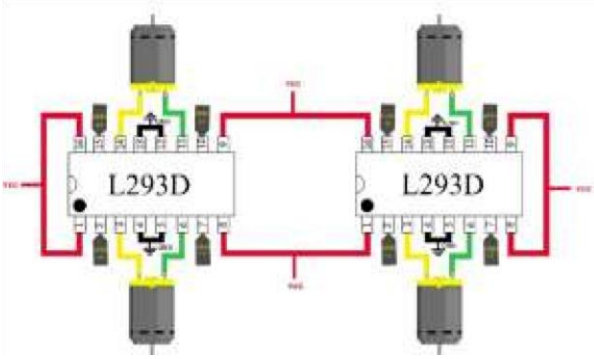

Figure 3: L23D Motor Driver pin assign

Voltage Specification:
VCC is that the voltage that it needs for its own internal operation 5v; L293D won't use this voltage for driving the motor. For driving the motors it is a separate provision to provide motor supply VSS (V supply). L293d will use this to drive the motor. It means if you'd wish to work a motor at 9V then you'd wish to supply a Supply of 9V across VSS Motor supply.

The maximum voltage for VSS motor voltage is 36V. Since it can drive motors Up to 36v hence you'll drive pretty big motors with this l293d

VCC pin 16 is that the voltage for its own internal Operation. The utmost voltage ranges from 5v and up to 36v.

C. ***CCD Sensor*** Charge-coupled devices (CCDs) find wide applications in most digital image-acquisition
devices. The wireless CCD camera (in figure 4) it has audio and video system.

The range of transmitted is 100ft visible round the Spy robot and determination is 1024×800. Power is supplied to CCD camera by +5V from Lithium ion battery. This camera can move left and right direction to ascertain survey round the robot. There is no USB port during this camera in order that saving and records process of the project need capture card as shown in figure 4.

Figure 4: Wireless CCD Camera

D. Metal detector

A detector is an electronic instrument that detects the presence of metal nearby. Metal detectors are useful for locating metal inclusions hidden within objects, or metal objects buried underground. They often contains a handheld unit with a sensor probe which may be swept over the bottom or other objects. If the sensor comes near a piece of metal this is indicated by alert message.

The metal detector in the spy robot is used to detect any objects which is metallic in nature which could be mines in the field. The metal detects the presence of the metal once the bot passes through the metallic objects. It sends the alert to the base to notify that there is a mine which is under the metal detector

Figure 5: Metal detector

E. Motion Sensor:

A passive infrared sensor (PIR sensor) is an electronic sensor that measures infrared (IR) light

radiating from entities in its field of view. They're most frequently applied in PIR-based motion detectors. PIR sensors are normally utilized in safety alarms and automatic lighting applications.

PIR sensors detect general movement, but don't give information on who or what moved. PIR sensors are usually called simply "PIR", or sometimes "PID", for "passive infrared detector". They work entirely by detecting infrared (radiant heat) emitted by or reflected from objects.

Figure 6: Motion Sensor

It is used to detect the human near to the spy bot

F. Soil Sample Collector

In this era Nuclear is the most threaten in this world WNO Says that Nuclear weapons will not use in any war. But the Reality is that Country who were involved in nuclear research .Most of the nuclear research base are in underground the radiation of the nuclear will affect the soil

Figure 7: Soil Sample Collector

By using our Robot to collect the sample the field and it will process by our scientist to detect if any radiation present in a soil.

HARDWARE CONFIGURATION

A. Remote Controller Configuration

The remote controller consist six press button which is forward, backward, left, right, to control the locomotion of the spy bot and sample collector is used to collect the sample of the soil as shown in figure 8(a). Moreover, it consists GUI

(Graphical User Interface) to easy use.

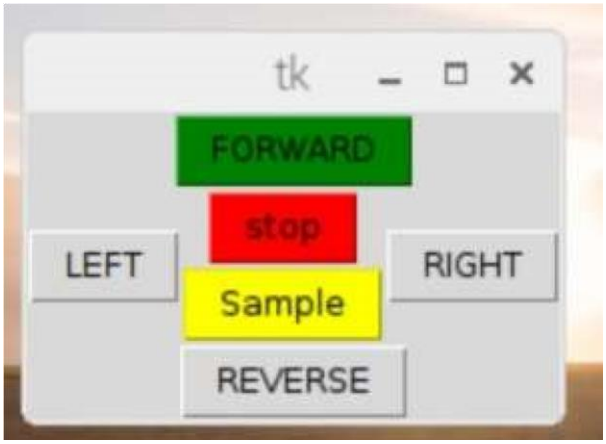

Figure 8 (a): Remote controller

In figure 9, in this we are using H-Bridge to control direction of a motor and by using a pwm we can also control the speed of the motor .This driver circuit can able to control two motors at the same time .And it also helps to protect from a back emf which is produced by a motor

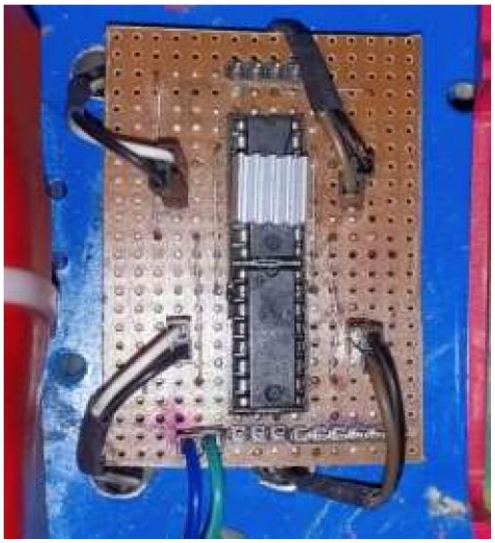

Figure 9: Motor Driver Circuit

The project uses mainly Raspberry pi to control the motor driver and to transmit live video footage from a Field to base by using a 5.8 GHz frequency for better transmission speed.

Raspberry pi takes a Serial output from a base to give a signal to a motor driver its already programmed with a python language

The Programming uses a logic input to perform a various operations

In Spy Robot (vehicle), it consists of a microprocessor, a CCD sensor (camera), four movable wheels, four DC motors, two motor drivers, Raspberry pi is powered with 5V power supply and motor driver is powered with a 12V power supply via motor driver.

There are four motors for wheels and one motor for Soil sample collector. These Five motors need 12V power supply. To activate the motors, L293D motor drivers are used in this project.

There are required two motor drivers: two motor drivers are used to control the four motors .In this system, Brush DC motors are used for all required motorized equipment's.

Each Brush DC motor is functional on each wheel. Four wheels can perform forward and backward functions because of Brush DC motor's reversible abilities.

Brush DC motors join with gear as a group during this project for moving control as shown in figure 8. The two set are mounted on rare wheels correspondingly and also one for camera motion. Worm gear is employed to scale back an outsized speed ratio of the motors.

In left and right operation of spy robot, the system proposes the PI controls. To rotate the left direction, while the left motor will move reverse, the proper motor will move forward. To rotate the proper direction, while the proper motor will turn reverse, the left motor will turn forward.

If the motor spins forwardly is left camera rotation, the motor spins reversely is true camera rotation, the other

B. *The Spy Robot Configuration*

way around.

Figure 10: Brush DC motor connect with gear

A DC motor is any of a category of rotary electrical motors that converts DC electricity into energy. The most common types believe the forces produced by magnetic fields. Closely all kinds of DC motors have some inner machine, either electromechanical or electric, to intermittently change the direction of current partially of the motor.

DC motors were the primary sort of motor widely used, as they might be powered from existing direct-current lighting power distribution systems. A DC motor's speed are often controlled over a good range, using either a variable supply voltage or by changing the strength of current in its field windings. Small DC motors are utilized in tools, toys, and appliances. The universal motor can operate DC but may be a lightweight brushed motor used for portable power tools and appliances. Larger DC motors are currently utilized in propulsion of electrical vehicles, elevator and hoists, and in drives for steel rolling mills. The advent of power electronics has made additional of DC motors with AC motors possible in many uses. DC motor can rotate clockwise and anticlockwise so that we use in this project. Figure 10

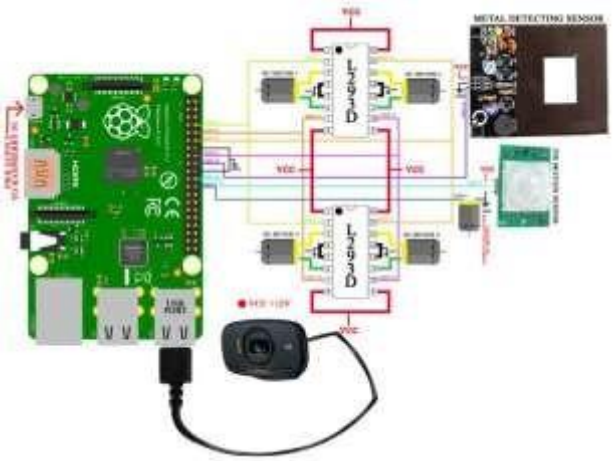

Figure 11: Ci rcuit Diagram for the spy robot vehicle

III. SIMULATION AND TEST RESULT

The simulation and result for this system is obtained from the two main components used in the spy robot. The components used in the bot are metal detectors and motion sensor. The metal detector is used to detect any presence of metallic objects among the scanned substances. While performing a surveillance, if any objects having metallic nature are to be found an intimation to the user is being sent to the user stating the presence of the object in the scanned area. The figure 12 (a) depicts the output of the metal detector.

Figure 12 (a): Metal detection output

Also the other way of observation is done by sensing the presence of moving objects or even human beings using the motion sensor. The motion sensor once on detecting the human being will immediately send the notification to the user stating their presence in the area. This feature in the spy robot is used for identifying the hostages and also the terrorists estimating their numbers as it will be easy for the user to formulate a plan according to the situation. Once the humans are detected the user receives a notification

Figure 12 (b): Human detection output

Now let's look into the programming part of the system. The program consist of simple codes which will initially define every known element required in the program. The elements such as the wheel direction, sensor and metal detector input will be defined in the program. The figure 13 (a) represent thee defined objects in the program.

```
import RPi.GPIO as GPIO
import time
from Tkinter import *
root = Tk()
GPIO.setmode(GPIO.BCM)
GPIO.setwarnings(False)
GPIO.setup(14,GPIO.OUT)
GPIO.setup(15,GPIO.OUT)
GPIO.setup(18,GPIO.OUT)
GPIO.setup(23,GPIO.OUT)
def forward():
        GPIO.output(14,GPIO.HIGH)
        GPIO.output(15,GPIO.HIGH)
        GPIO.output(18,GPIO.LOW)
        GPIO.output(23,GPIO.LOW)
        print("FORWARD")
def reverse():
        GPIO.output(14,GPIO.LOW)
        GPIO.output(15,GPIO.LOW)
        GPIO.output(18,GPIO.HIGH)
        GPIO.output(23,GPIO.HIGH)
        print("Reverse")
def left():
        GPIO.output(14,GPIO.LOW)
        GPIO.output(15,GPIO.HIGH)
        GPIO.output(18,GPIO.LOW)
        GPIO.output(23,GPIO.HIGH)
        print("Left")
def right():
        GPIO.output(14,GPIO.HIGH)
        GPIO.output(15,GPIO.LOW)
        GPIO.output(18,GPIO.HIGH)
        GPIO.output(23,GPIO.LOW)
        print("right")
def stop():
        GPIO.output(14,GPIO.LOW)
        GPIO.output(15,GPIO.LOW)
        GPIO.output(18,GPIO.LOW)
        GPIO.output(23,GPIO.LOW)
        print("stop")
```

Figure 13 (a): Program for Bot Locomotion

which is shown in figure 12 (b).

After defining the objects the conditions of the system is being written which contains the logic on how the spy robot is said to do its function. The figure 13 (b) shows the main

function of the program.

```
import cv2

def show_webcam(mirror=False):
    cam = cv2.VideoCapture(0)
    while True:
        ret_val, img = cam.read()
        if mirror:
            img = cv2.flip(img, 1)
        cv2.imshow('Live Camera', img)
        if cv2.waitKey(1) == 27:
            break  # esc to quit
    cv2.destroyAllWindows()

def main():
    show_webcam(mirror=True)

if __name__ == '__main__':
    main()
```

Figure 13 (b): Camera function

In order to understand the program of the robot

the flowchart for the program is being shown in the figure 14 which briefs about the conditions and its result which will be determined by the conditions which tends to become true while the robot being in the field.

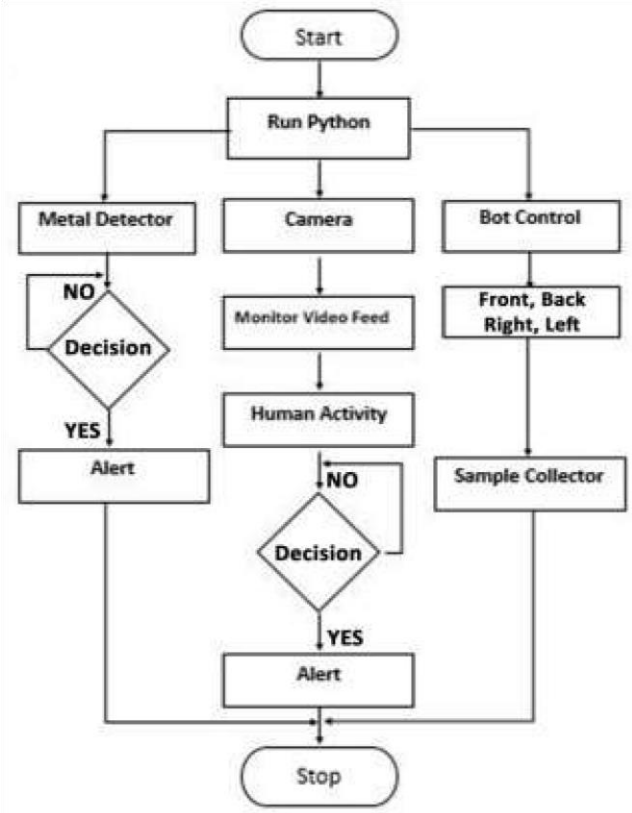

Figure 14: Flow chart of the program

Initially the python software is allowed to run which checks the system stability. After checking the system, the system waits while a subroutine program is said to be running individually for every component. If a metal or human is being by the robot the decision is being made the system which will instantaneously alert the user notifying the presence of the human or metals in the area. The bot is also controlled accordingly to the collected samples and will estimate the direction in which the

robot should progress in order to gather the samples which would be scattered around the scanned area.

Figure 13 (c): Output Screen The robot equipped with a wireless camera, which isn't very useful in situations where the visibility or light level

is extremely low. For night or dark area, Spy robot are going to be almost impossible for identifying objects because the lights, which are provided on the robot, are fixed therefore it's going to not be possible to look at those objects which are within the dark. At night or dark area where light is low a lightning circuit are often mounted on the robot rather than an evening vision camera, which can increase the visibility in case of no light at all. Lighting circuit is used in this project to use the Spy robot in the dark area as night.

The system is meant to develop a spy robot with wireless CCD sensor by using two different PICs. The spy robot contains two main sections. The first sector of spy robot is especially getting broadcast between spy robot and remote controller for the robot drive. There also are two main

Figure 13(d): Live Camera Feed

parts; Between the CCD sensor's transmitter and receiver. And another is that the robot sends back the pictures and capturing it. In these processes, frequency (RF) module is employed for wireless communication between the remote controller and spy robot. The remote controller will send user instructions to the robot. The camera assail the robot captures the encompassing conditions while the robot moves along user desired direction. And then the robot sends back the pictures captured by the camera as video and audio format. The remote controller consists of by six buttons is made for 6 functions like forward, backward, left, and right operations for the robot movements and another left, right operation for the camera rotation.

Figure 15 (a): Front View of Spy Robot

Figure 15 (b): Top View of Spy robot

The spy robot is formed from four wheels vehicle and a camera. Each rare wheels of the vehicle has existed set by each motor for vehicle's motion. The forwardfacing wheels of the vehicle are constantly fixed on an axis is shown in figure 15 (a). The vehicle can move forward and backward directions and also the spy robot is made up of four wheels vehicle and a camera. The vehicle can move forward and backward directions and also shown in figure 15 (b).

V. CONCLUSION

This kind of robot can do hard and repetitive works for humans. It can have a really risky job and such dangerous job might be done by using small spy robot. But it's useful to see and appearance out the places where dangerous poison gases have. Spy robot also can be utilized in searching people that are in building destroyed by the earthquake. Because of the wireless camera is installed in spy robots, it are often used remotely to enter and exit dangerous place that human cannot. When the user controls by remote controller, the spy robot will move to desired destination and spy images round the robot. Lightening LED is mounted on Spy robot and features a stand which may be a place for rescuing device. The robot isn't quite huge one and designed to be easy in transportation. For the entire system, the specified power is supplied by Lead acid batteries which connected the transformer.

FURTHER EXTENSION

This operation system is that the spy robot with wireless remote. The CCD camera can modify range quite 100ft .The wireless camera are often ready to upgrade with the 360 degree left and right directions by using PIC program so that the functionality has a movement at many sides. Moreover, this camera can upgrade to maneuver up and down directions. Instead of DC motors which driver the CCD camera, stepper motors also can be used. The spy robot are often commanded directly by laptop keyboard without using remote controller. For the advance of spy robot, it are often built a robot with wireless sensory system that the user can observe and control things via computer or mobile.

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Rodney Brooks warns that abstraction can be dangerous and that truly intelligent robotic systems will not follow the box world we have created for them. Therefore, we should not design our robot with limited conceptions of its world, but instead create the desired complex behavior by combining simple behaviors. Unfortunately, our robots are not of the right architecture to create "robotic insects," but in some cases using a subsumption architecture may be Appropriate.

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Robots.

Application:

The Polly system has some similarities to our own robot in that both are intended to use vision to perform tasks for extended periods of time. Both robots also try to find humans. The Polly system uses place recognition that is different to ours. Polly is sensitive to

dynamic changes in the environment, while our system relies on navigating by fixed landmarks such as doors and hallways.

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Application of cognitive radio and interference cancellation in the L-Band based on future air-to-ground communication systems.

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ABSTRACT:
The Very High Frequency band (VHF) currently used for aeronautical communications is becoming congested, and future Air-to-Ground (A/G) communication will require much greater use of data communications. For meeting future capacity requirements in aeronautical communications, we propose two new approaches one of which is a cognitive radio based A/G communication network that provides dynamic spectrum access to airplanes to overcome the spectrum scarcity problem in the VHF band.

Another approach involves use of a new spectrum in the Ultra-High Frequency band (UHF) to create a new A/G link. In this paper, we propose and investigate the possibilities for developing a spectrum sensing approach to detect idle band in the VHF spectrum and analyze the possible interference between future L-band Digital Aeronautical Communication System (L-DACS) and legacy aeronautical systems.

Application of cognitive radio and interference cancellation in the L-Band based on future air-to-ground communication systems.

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INTRODUCTION:

Over the past few years, the air transport industry has experienced a continuous evolution and the requirement for passenger air traffic is forecast to double by 2025 . The growth of air traffic at the airport requires an advanced and efficient Air Traffic Management (ATM) infrastructure that can cope with the new requirements of the future air transportation system. The current system for air-to-ground(A/G) communication is guaranteed by the integration of two systems deployed in the 118–137 MHz VHF aeronautical band. One of these is an analog system based on Double-Side Band Amplitude Modulation (DSB-AM) developed for voice transmissions that has been in use for more than 70 years . The second system is a recently introduced digital system that enables transmission of data from various airplanes in real time. The Broadband VHF (B-VHF) system is introduced as an alternative A/G communication system for ATM including both the Air Traffic Control (ATC) and Aeronautical Operational Control (AOC) . The main goal of the B-VHF system is to prove that it is feasible to create a multi-carrier based overlay system for future ATC communications in the VHF band without causing interference to legacy VHF systems.

The B-VHF system is capable of fulfilling expectations of a future ATC communications system like increased capacity, high efficiency, increased robustness, and improved communications system safety. However, the VHF band is already saturated. For the implementation of future A/G communications component of Future Communications Infrastructure (FCI), the International Civil Aviation Organization (ICAO) recommended the use of the L-band between 960 and 1164 MHz if coexistence with legacy systems is ensured

EXISTING SYSTEM:

The broadband aeronautical multi-carrier communications (B-AMC) system is a promising candidate for the future L-band radio system called L-band digital aeronautical communications system (L-DACS). In this paper, the design of the physical (PHY) as well as of the data link layer (DLL) is addressed. As B-AMC is intended to be operated in the L-band between two adjacent distance measuring equipment (DME) channels. In order to demonstrate the feasibility of the coexistence with DME, a draft frequency planning has been performed for Europe, resulting in successful frequency assignments in wide parts of Europe. The B-AMC DLL supports data link communication with low latency and high throughput.

DISADVANTAGES:

- It can't avoid of mutual interference between existing L-band systems and B-AMC.
- It is designed not highly configurable for traffic profiles.

PROPOSED SYSTEM

- In the AS transmitter section, the binary input data are modulated with a modulation technique such as BPSK, or QPSK, or QAM.
- Modulated data are converted into OFDM frames by using frame composer. Afterward, OFDM frames are converted into time domain OFDM symbols by performing IFFT operation.
- At the GS receiver, the faded versions of the signals are received. Based on the OFDM synchronous sequence of the received signal, the time and frequency offset are estimated and the received frames are rearranged based on the estimated frequency offset. The useful part of the OFDM symbols is extracted.
- The extracted part of the OFDM symbol is transformed into the frequency domain by applying FFT operation. Based on the received pilot symbol, the complex channel response coefficients are estimated by channel estimation and equalization.
- The frames are decomposed into a useful data symbol by using frame decomposer. Reliable information for each bit is computed by applying demodulation. Finally, BER for each bit is computed.

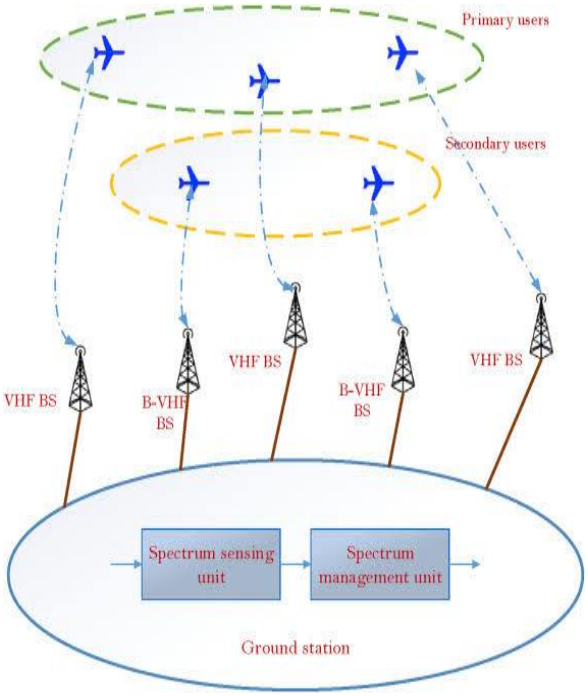
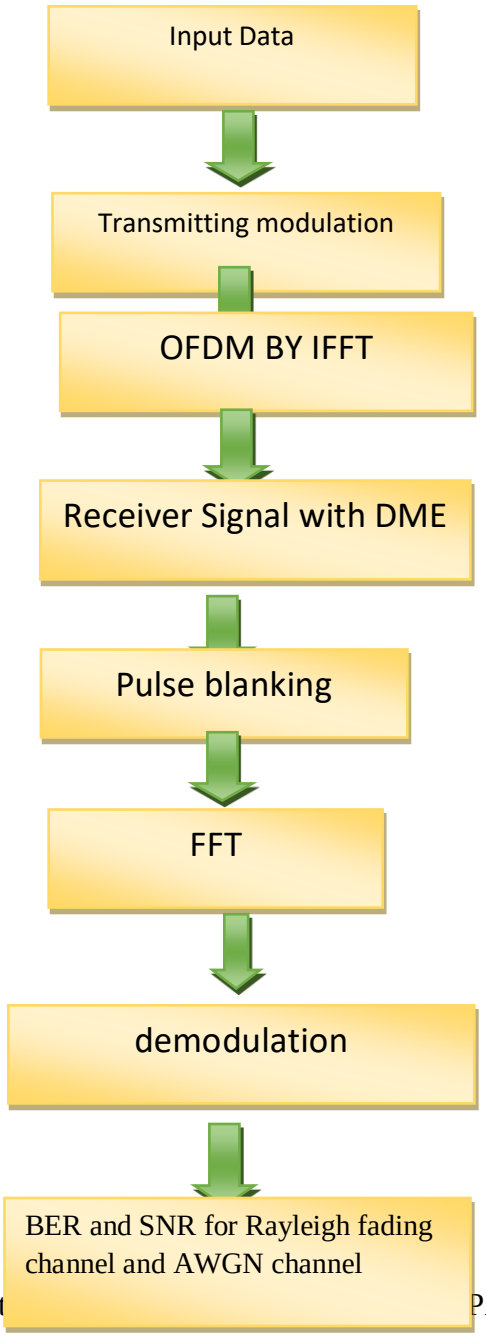


Fig 1. Proposed B-VHF based A/G communication.

ADVANTAGES:

- The input symbol can be easily recovered by applying channel estimation and equalization
- It is designed to meet the requirements of the future aeronautical communication system
- It is designed to be highly configurable and to support different service requirement sets and traffic profiles

Flow chart


Input Data
Transmitting modulation
OFDM BY IFFT
Receiver Signal with DME
Pulse blanking
FFT
demodulation
BER and SNR for Rayleigh fading channel and AWGN channel

SYSTEM REQUIREMENTS:

GENERAL:

The system requirement of the project is described and the specification of the software and hardware requirements of the project is described.

SOFTWARE REQUIREMENTS

- Operating System : Windows 7
- Software Programming Package : Matlab R2018a

MODULE:

- Input signal
- OFDM modulation
- DME interference
- Pulse blanking
- Demodulation
- BER & SNR

Simulation Results:

The performance of the L-DACS1 RL in comparison with the AWGN and Rayleigh fading channel, which is modeled using Jakes distribution, pdp, and delay-Doppler power spectrum, is evaluated. For representing the aeronautical propagation channel environment, an en-route channel model is applied to a strong LOS path, Doppler frequencies of up to 413 Hz, and two delayed paths. In the simulations, L-DACS1 RL parameters are assumed. All OFDM symbols within a frame are used for transmitting QPSK modulated data. Structure of an L-DACS1 RL data and DC segments is simulated. The number of tiles in DC and data segments is assumed as two. It also assumed that two AS are active in the serving GS. Schmidt and cox's timing estimator is used as a time synchronous algorithm for maintaining orthogonality of the sub-carriers.

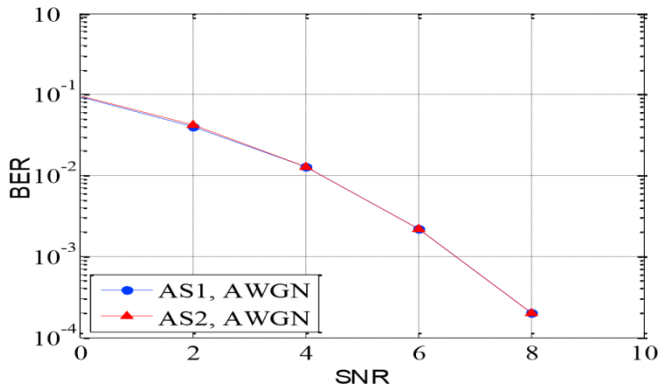


Fig. 2. BER performance for L-DACS1 RL with AWGN channel.

The BER of the DC and data segment in L-DACS1 RL system for AS1 and AS2 when applying AWGN channel is depicted in Fig.2

As seen, the BER performance of AS1 and AS2 are almost identical. The BER of the DC and data segment in L-DACS1 RL system for AS1 and AS2 when applying Rayleigh fading channel model by pdp is depicted in Fig. 3. As seen, the BER performance of AS1 and AS2 almost have an identical performance. Because of the channel nature of Rayleigh fading channel, the performance is worse than the AWGN case. The main motive of this simulation is to show the feasibility of using Schmidl and Cox method for timing and frequency synchronization that can help maintain the orthogonality between the subcarriers. It also shows the performance of the L-DACS1 RL systems with different aeronautical channel model. This work can be extended to the case of L–DACS1 FL and also to mitigate the DME interference on the LDACS1 system based on suitable spectrum sensing technique.

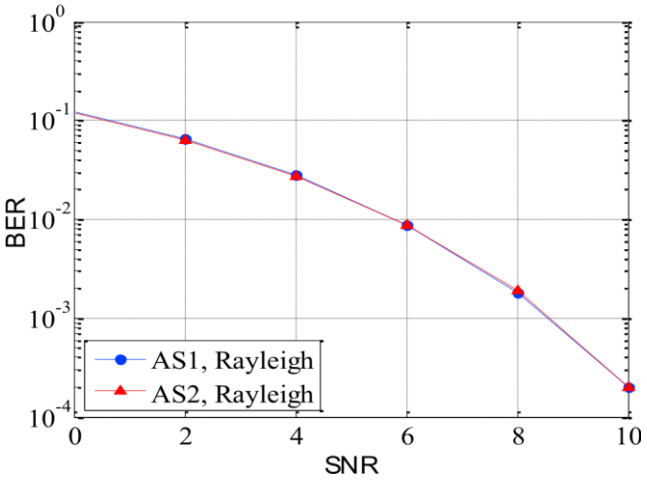


Fig. 3. BER performance for L-DACS1 RL with Rayleigh fading channel.

In Fig.4, the BER vs SNR for LDACS1 RL is plotted and compared with DME interference, without DME interference and simple pulse blanking method. The main purpose of this comparison is to show the influence of the DME interference on to the performance of the

LDACS1 RL system. It can be observed from the figure that the performance of the LDACS1 system is affected by the DME interference and the effect of this interfererce can be reduced by applying simple pulse blanking methods .

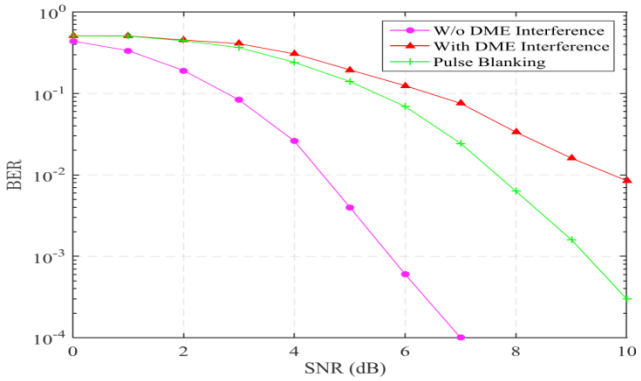


Fig. 4. BER performance of the proposed LDACS1 with DME interference and after pulse blanking as a function of SNR over AWGN channel

Fig.5 shows the OFDM signal for transmitting LDACS1 signal, received LDACS1 signal with DME interference, and received LDACS1 signal with DME interference after applying the pulse blanking method , respectively. From our simulation results we observe that a significant amount interference from the DME station can be reduced by the simple blanking method.

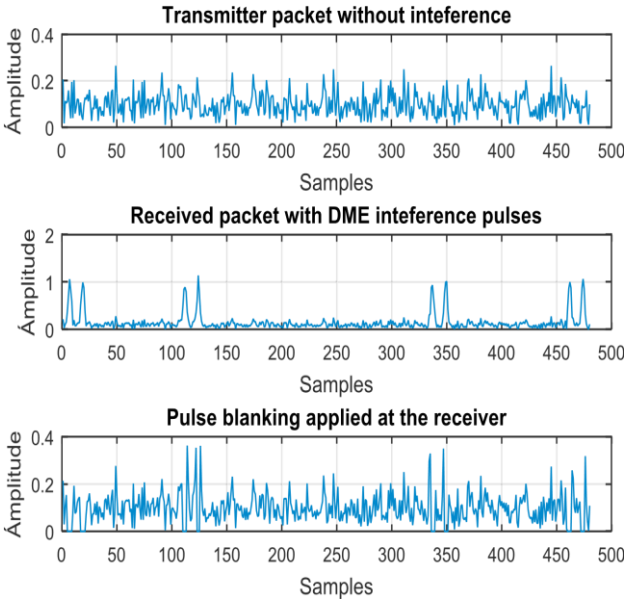


Fig.5. Simulation output

Conclusion

Aircraft Communications Addressing and Reporting System (ACARS) has been used in recent years for A/G communications for sending information, including maintenance (health) data from aircraft to ground station. However, it is still limited to relatively simple messages and its bandwidth is limited. With the proliferation of airplanes, spectrum congestion will severely affect this system. The proposed cognitive radio based A/G communication system overcomes this problem by providing opportunistic spectrum access to airplanes in a seamless manner for communicating with the ground station. L-DACS1 is the broadband candidate for future A/G communication system in the L-band. It is designed to meet the requirements of the future aeronautical communication system. In the future, an important issue that needs to be addressed in the L-DACS1 system is radio frequency compatibility as it has to coexist with several legacy systems that are already operating in the L-band.

Future scope:

The future communications study has selected two technology choices for the L-band Digital Aeronautical Communication System (LDACS), namely LDACS1 and L-DACS2, as the most promising candidates for fulfilling the requirements of a future aeronautical data link. The LDACS system is capable of providing various kinds of services for ATM via deployed Ground Stations (GS). L-DACS1 is the first choice based on a multi-carrier technology that utilizes Orthogonal Frequency-Division Multiplexing (OFDM) . Since the amount of spectrum available in the L-band is limited, the transmission bandwidth is limited to approximately 500 kHz. To avoid splitting up this limited bandwidth between Forward Link (FL) and Reverse Link (RL), Frequency-Division Duplex (FDD) is applied. As a result, this L-DACS1 design approach achieves net data rates ranging from 561 kbps (with strongest coding and robust modulation) to 2.6 Mbps (with weak coding and higher order modulation) for a pair of forward and reverse link channels. The second choice, L-DACS2 , is a narrow-band single-carrier technology with 200 kHz transmission bandwidth. It uses Gaussian Minimum Shift Keying modulation (GMSK). For duplexing, Time-Division Duplex (TDD) is chosen. With a modulation rate of 271 kbps, the achievable net data rate is in the range of 70–115 kbps.

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TITLE
ELECTROCHEMICAL SENSORS USING CNT'S –REVIEW

AUTHORS
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ABSTRACT:
The Carbon Nano-tubes are used as biosensor due to their ultra-sensitive and ultra-fast sensing nature. The CNTs exhibit excellent mechanical, electrical and electro chemical properties due the above reasons they got a stimulated interest in the application of CNTs in biosensors. This review on recent research in field of CNTs based biosensors. The structure, functions, and their properties. This review highlights of different methods in which CNTs are prepared for the use of biosensors and in addition future research and development in CNTs based biosensor in the field of medical science. CNTs paly's important role in the electrochemical biosensors, immune-sensors, and DNA biosensors. Here we discusses about the factors effects the practical use of CNTs as biosensors. After an overview on CNTs based biosensors and their structures and properties we summarize the application of CNT based electrochemical sensors and biosensors.

ELECTROCHEMICAL SENSORS USING CNT'S –REVIEW

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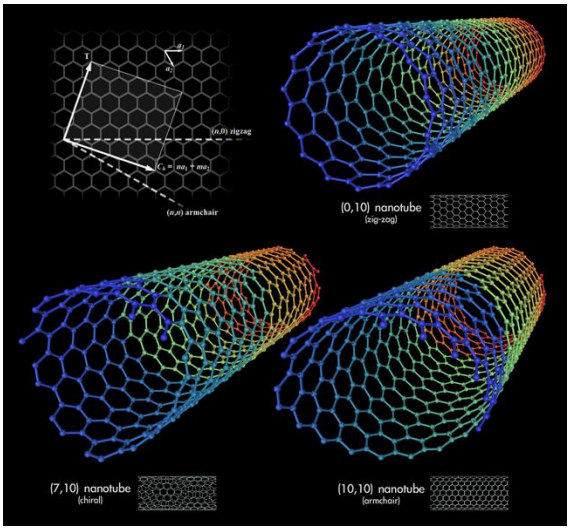
Abstract: The Carbon Nano-tubes are used as biosensor due to their ultra-sensitive and ultra-fast sensing nature. The CNTs exhibit excellent mechanical, electrical and electro chemical properties due the above reasons they got a stimulated interest in the application of CNTs in biosensors. This review on recent research in field of CNTs based biosensors. The structure, functions, and their properties. This review highlights of different methods in which CNTs are prepared for the use of biosensors and in addition future research and development in CNTs based biosensor in the field of medical science. CNTs paly's important role in the electrochemical biosensors, immune-sensors, and DNA biosensors. Here we discusses about the factors effects the practical use of CNTs as biosensors. After an overview on CNTs based biosensors and their structures and properties we summarize the application of CNT based electrochemical sensors and biosensors.

KEY WORDS: Carbon Nano-tubes; Electro-chemical biosensors.

INTRODUCTION: Sensors are a class of devices used for detecting of variable quantity, real time tracking of chemical signals in biological cells. In general a sensor comprises of an active sensing element, signal transducer. The sensors are classified under the type of energy transfer they are thermal, electromagnetic, mechanical, and electro-chemical sensors. Were as the most important aspect of the sensor are sensitivity, selectivity, and stability. Among this the above different types electro-chemical sensors are the most promising analytical methods due their high rate selectivity and sensitivity. The sensing element is responsible for its selective detection of analyte and signal transducer converts a chemical event into appropriate signal that can be used with amplification or without it. The biosensors are first reported in the year of 1960 which differ from chemical sensors in two different aspect (a) the sensing element consist of biological materials such as proteins, enzymes, (example; blood smaple, cell receptors, antibodies, poly-nucleotides, micro-organisms, or whole biological tissues). Currently much attention has been intended to focus on the developing nanomaterial, they are usually take advantage of lager surface area for bio molecules to be immobilized. That generally increases the binding sites available for detection of specific chemical analyte. Electro-chemical biosensors are most popular biosensors. The various nanomaterial are used in electro chemical sensors. CNTs (carbon nanotubes) are mostly used nanomaterial due their fascinating properties, such as unique chemical, electronic, mechanical. The CNTs have large length-to-diameter ratio provides for high surface-to volume ratios.



(a) This image gives the information about the structure of CNTs..

CNTs possessed SP^2 carbon units with several nanometers in diameter and many microns in length. Depending on the graphene sheets rolling there are different structures of CNTs. In a graphene the points O&A are crystallographically same this points can be connected through a vector called chiral vector (OA) based on this vectors value and by its angle the carbon nanotubes are differentiated into chiral, zigzag, armchair. There are two types of CNTs Multi-walled carbon nanotubes (MCNTs), Single-walled carbon nanotubes (SWCNTs). The carbon nanotubes can be synthesized by electrical arc discharge, laser vaporization, chemical-vapor deposition methods, CNTs behave as metals or semiconductors based on diameter and degree of helicity. More over CNTs outstanding ability to mediate fast electron transfer kinetics for a wide range of electro active species like hydrogen peroxide and also CNTs chemical functionalization can be used to attach almost any desired chemical to it.

The review focus on the use of CNTs as electrochemical sensors and biosensors. Their are thousands of papers published on this topics during the last decade and more research is going on. This article is organized as follows, first an overview on the process how the different types of CNTs are prepared, and how a biosensor can be functioned, then the next section describes about the properties of CNTs and their functions as biosensors. The complications due to the use of CNTs based biosensors in day-to-day life. Then finally future use and development of CNTs, and conclusion.

SYNSTHISIS OF CNTs BY DIFFERENT METHODS:

The CNTs can synthesize by use different methods like 1) Arc discharge method, 2) Laser Ablation method, 3) Chemical vapor deposition method (CVD).

Arc Discharge Method: The nanotubes were observed in 1991 in the carbon soot of graphite electrodes during an arc discharge, by using a current of 100 amps that was intended to produce fullerenes.

The yield of this method is up to 30% by weight and it produces both single and multi-walled nanotubes with lengths of up to 50 micrometers with few structural defects. Arc-discharge technique uses higher temperature above 1,700 degree centigrade for CNTs synthesis which typically causes the expansion of CNTs with fewer structural defects in comparison with other methods.

Laser ablation: In laser ablation a pulsed laser vaporizes graphite target in a high temperature reactor while an inert gas is bled into the chamber. Nanotubes develop on a cooler surfaces of the reactor as the vaporized carbon condenses. A water cooled surface may be included in system to collect nanotubes.

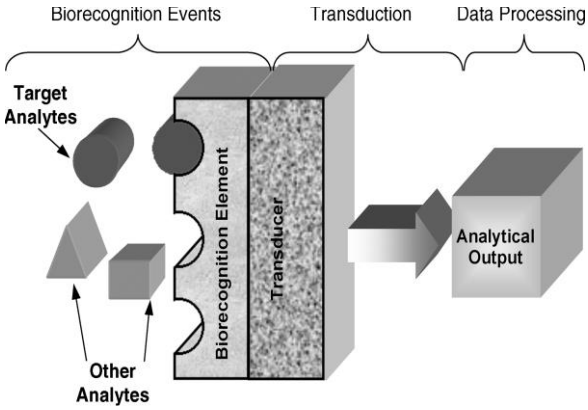
The laser ablation method yields around 70% and produces primarily SWCNTs with the controllable diameter determined by reaction temperature. But it was more expensive than either arc discharge or chemical vapor deposition.

Chemical Vapor Deposition: The chemical vapor deposition is the most popular method of producing the CNTs. Thermal decomposition of hydrocarbon vapor is produced in presence of metal catalyst by this process. Therefore it is also known as thermal CVD or catalyst CVD.

When compared to the above two methods this, method is simple & economic for synthesize of CNTs at low temperatures, & ambient pressure. In crystallinity of CVD grown CNTs is less accurate then both methods but SWCNTs are some close to the other methods. The purity & yield CVD is higher compered to arc and laser methods. Structure and architecture CVD is only way for the growth of CNTs. CNTs grown in CVD method have many advantages that they can have variety of forms powder, thin or thick films, aligned or entangled, straight or coiled nanotubes, or desired structure of preferred sites of a patterned substrate.

Electro-Chemical Biosensors Based on CNTs: The electrochemical nano biosensors are having extremely lower limits of detection, they are some of frequently used biosensors. The electrochemical biosensors are inexpensive they can easily make on smaller scale, essential and also they requires simple electronics for accepting certain circumstances by making them most suitable for point of care applications. An electro-chemical-biosensor is analytical tool for sensitive & selective detection of bio-molecules. CNTs are extremely attractive for fabricating electro-chemical biosensors due their specific

properties like conductive, adsorptive & biocompatibility. Vertically aligned CNTs can be coupled with enzyme to provide a favorable surface orientation and act as an electrical connector between their redox center and the electrode surface. Electrochemical transducer is based on the movement of electrons in the redox reactions detected when a potential is applied between the electrodes. The electrochemical sensors can be based on potentiometry, amperometry (detection of ions based on change in electric current), voltammetry(in this the information of analyte is obtained by measuring current as a change in potential), coulometry, AC conductivity or capacitance measurements. Most of the CNT based electrochemical biosensors perform the detection of bio-molecules amperometrically.



This image give us an idea about the biosensor working.

There are mostly two cases like enzymatic biosensors, & enzyme-free electrochemical biosensor. There are number of aspects which we need to consider when analyzing a various biosensors. First of all we have to know the range of sensor that in which range it is sensitive. Next the sensor stability which plays key role in detection of bio-molecules.

Biosensors based on CNTs: This type of sensors are most frequently used from 2000. There are in different biosensors like oxygen biosensor, glucose biosensor ,lactate, cholesterol . Mostly the glucose biosensors have gathered a significant place in the sensing field as the glucose biosensor is used to sense glucose (sugar level) in the blood and body fluids of the diabetic patient as the diabetes is mostly occurred diseases in the world. The oxygen biosensor is used to measure

the level of oxygen in the blood and body. As the oxygen sensing devise have a high interest in medical, environmental, & food processing industries. The enzymatic biosensors used to catalyze oxygen reduction to water. The MWCNTs are having high interest due to the electro-active surface area because of nano-structuring of electrodes. All this leads to thin layering which in turn leads to layer formation. Due this layer when any redox reaction occurs at the carbon nano-tubes surface leads to increase to obtain the currents which h obtained due to oxidation or reduction of chemical substances. Due this type of feature the enhancement two main abilities of electrochemical bio-sensor likely sensitivity and reliability.

Future perspectives: Beyond the applications mentioned above in the field of CNT based biosensors is currently experiencing a more developments in the future.

One of the developments of CNTs is integration of biological cell membranes and CNT transistors which give the way for the obtaining information about the distribution charges within the membrane. The most recent advances like implantation of CNT biosensors into living biological tissues, & development of novel fluorescence based CNT sensors, and another most important issue related to the integration of CNTs into cells & tissues to study the cytotoxicity towards biological species. Therefore many and many more experiments are going on process to find out the toxicity of CNTs when in contact with cells & tissues.where as MWCTs have been found to cause irritation in human keratinocytes and SWCNTs reported as toxic to mammalian cells beyond 10μmol/L. where as in some of the studies the chemically modified CNTs can reduce their cytotoxicity to some extent. Moreover the studies based on the effects of CNTs on human cells and tissues as well as information related to safety issues are still lacking, and future work must concentrate on addressing these aspects.

Conclusion: Due to their small size and excellent electrochemical properties, CNTs continues to attract enormous interest as components in biosensors. The CNTs modified electrodes allows the direct transfer of electrons with enzymes.where as the chemical modification of CNTs has proven to be an effective way to impart selectivity to resulting biosensor. In the developmental of CNTs we need to prevent the nonspecific adsorption of biomolecules onto the tube wall. The CNTs exhibit excellent electro-catalytic activity in redox behavior of different compounds.

However there are number of challenges for CNTs to become a part of in the application of a biosensor. The production of CNTs with defect free and to produce pure one's is difficult and costly. Where as processing of CNTs is not fully controlled and the lengths and diameter of the nanotubes are uncontrolled. The CNTs causes much toxicity for biological organisms. They are mostly insoluble in most solvents. The CNTs can be dispersed in Nafion, Teflon, CS, mineral oil, sol-gel, silica, & in some polymers but the chemical nature and conductivity is impaired or decrease. While there have some disadvantages of CNT-modified electrode for sensing application the continuous growing research interest in the field is contributing to overcome them. The aforementioned outstanding properties of CNTs make them an exciting alternative for the development of novel electrochemical sensors and biosensor. It is believed that the merits of CNT-based sensors will bring dramatic changes to future sensor industry.

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TITLE
THE PCA AND MLRI SCHEMES FOR IMPROVING THE DIGITAL IMAGE QUALITY

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ABSTRACT:
Digital cameras have become popular, and many people are choosing to take their pictures with digital cameras instead of film cameras. When a digital image is recorded, the camera needs to perform a significant amount of processing to provide the user with a viewable image. An important part of this image processing chain is color filter array (CFA) interpolation or demosaicking. The most popular and widely used CFA is the Bayer CFA. The CFA raw data denoising is challenging. If the reduction of the noise in the noisy CFA raw data is done then the high-performance demosaicking algorithm is applied. For de-noising, the Principal component analysis (PCA) algorithm is used. For demosaicking, residual interpolation (RI) is proposed. Experimental results demonstrate that our proposed demosaicking algorithm using the RI surpasses the state-of-the-art algorithms for the Kodak, the IMAX, and the beyond

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ABSTRACT: Digital cameras have become popular, and many people are choosing to take their pictures with digital cameras instead of film cameras. When a digital image is recorded, the camera needs to perform a significant amount of processing to provide the user with a viewable image. An important part of this image processing chain is color filter array (CFA) interpolation or demosaicking. The most popular and widely used CFA is the Bayer CFA. The CFA raw data denoising is challenging. If the reduction of the noise in the noisy CFA raw data is done then the high-performance demosaicking algorithm is applied. For de-noising, the Principal component analysis (PCA) algorithm is used. For demosaicking, residual interpolation (RI) is proposed. Experimental results demonstrate that our proposed demosaicking algorithm using the RI surpasses the state-of-the-art algorithms for the Kodak, the IMAX, and the beyond

Kodak data sets.

Keywords: Bayer color filter array, demosaicking, de-noising, residual interpolation, Principal component analysis.

I. INTRODUCTION

Single sensor color imaging uses only one CFA. Most popular and widely used is the Bayer CFA. Interpolation process gives high quality color images. Accuracy of the image is improved by interpolation process. Image enhancement is to process a given image so that the result is more suitable than the original image for a specific application. A demosaicking algorithm is a digital image process used to reconstruct a full color image from the incomplete color samples outputs from an image sensor overlaid with a color filter array (CFA). It is also known as CFA interpolation or color reconstruction. The aim of a demosaicking algorithm is to reconstruct a full color image (i.e. a full set of color triples) from the spatially under sampled color channels output from the CFA. Images captured with digital cameras are corrupted by noise due to the properties of the physical measurement process. Traditional image denoising algorithms have been based either solelyon image statistics or solely on noise statistics, but not both at the same time. Even though the case of additive white Gaussian noise is the type most considered in literature, there are also other types of noise models for images, which have been studied. These types of noise usually occur under more specific conditions and, therefore, special algorithms can be applied to incorporate the

additional information that is given through the more constrained noise type.

In the past literatures, many algorithms have been proposed based on the color difference interpolation because of its simplicity of implementation. The assumption for the color difference interpolation is that all color bands have spectral correlations and similar image structures such as textures and edges. Therefore, high-frequency energies are reduced in the color difference domains (i.e., R −G and B− G), which simplifies the interpolation process. For this reason, the color difference interpolation improves the demosaicking accuracy compared with the independent interpolation of each color band. In this paper, we propose residual interpolation (RI) as an alternative to the color difference interpolation. The RI performs the interpolation in a "residual" domain. Instead of calculating the standard color differences, it generates tentative estimates of the R and the B images (Rˇ and Bˇ) and calculate their residuals, which are the differences between the observed and the tentatively estimated pixel values (i.e., R − Rˇ and B − Bˇ).

The original RI, which is our initial work in, generates the tentative estimates by minimizing the residuals themselves using the guided filtering (GF). Instead, its extended version called minimizedLaplacian residual interpolation (MLRI) generates the tentative estimates by minimizing the Laplacian energies of the residuals. Our hypothesis for the MLRI is that if image interpolation is performed in a domain with a smaller Laplacian energy, its accuracy is improved. For example, the MLRI makes the interpolation process more precise because successive bilinear interpolation can provide better interpolation results for the images with smaller Laplacian energies. The MLRI can generally be incorporated with arbitrary demosaicking algorithms that involve the color difference interpolation. We incorporate the MLRI into the gradient based threshold free (GBTF) algorithm, which is one of the state-of theart Bayer demosaicking algorithms. Experimental results demonstrate that our proposed demosaicking algorithm using the MLRI outperforms existing state-of-the-art algorithms for the Kodak, the IMAX, and the beyond Kodak datasets.

II. PROPOSED DENOISING AND DEMOSAICKING ALGORITHM

The basic block diagram for our proposed method is shown in Figure1.

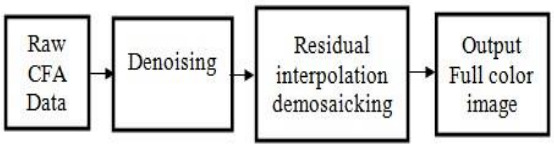

Figure 1: Proposed Block diagram

Demosaicking after de-noising is an effective method, here we propose this method. Denoising algorithms focus on reduction of Gaussian noise (Poisson noise). Denoising Gaussian noise is still important and challenging. The CFA raw data denoising is challenging, If the reduction of the noise in the noisy CFA raw data, we can simply apply the high-performance demosaicking algorithms. So the CFA raw data de-noising is proposed. The type of noise characterizationis shared among many signal processing systems and is commonly known as additive white Gaussian noise (AWGN).

Additive white Gaussian noise (AWGN) is a basic noise model used in Information theory to mimic the effect of many random

processes that occur in nature. AWGN is often used as a channel model in which the only impairment to communication is a linear addition of wideband or white noise with a constant spectral density (expressed as watts per hertz of bandwidth) and a Gaussian distribution of amplitude. However, this noise model does not hold for images captured from typical imaging devices such as digital cameras, scanners and camera-phones.

The raw data from the image sensor goes through several image processing steps such as demosaicing, color correction, gamma correction and JPEG compression, and thus, the noise characteristics in the final JPEG image deviates significantly from the widely-used AWGN noise model. Principal component analysis (PCA) algorithm is used for denoising. Principal component analysis (PCA) is a technique used to emphasize variation and bring out strong patterns in a dataset. It's often used to make data easy to explore and visualize. After de-noising is completed then demosaicking process is done.

Incorporate the proposed MLRI into the GBTF algorithm by green, blue and red interpolation. The GBTF algorithm interpolates the missing G pixel values first. The interpolation process of the G pixel values consists of four steps: (i) The Hamilton and Adams' (HA) interpolation formula is applied in the horizontal and vertical directionsto estimate the G pixel values at the R and B pixels andthe R and B pixel values at the G pixels.
As a result, thehorizontally and vertically interpolated R, G, and B pixelvalues are generated.

(ii) The horizontal and vertical colordifferences (R −G and B− G) are calculated for each pixel.

(iii) The horizontal and vertical color differences are smoothed and then combined into the final color difference estimate.

(iv). The G pixel values at the R and B pixels are interpolated by adding the observed R or B pixel values to the final color difference estimates. The G pixel value interpolation at the B pixels is performed in the same manner.

The HA interpolation formula in the step (i) of the GBTF algorithm can be interpreted as horizontal and vertical linear color difference interpolation. Replace the color difference interpolation with the proposed MLRI. Here, only consider the horizontal interpolation of the subsampled R pixel values. The vertical interpolation and the interpolation of the subsampled G pixel values are performed in the same manner.

Replace the horizontal linear color difference interpolation with the horizontal linear MLRI. The horizontal linear MLRI is performed in the same process flow as nondirectional MLRI. First, linearly interpolate the subsampled G pixel values. Then, the guided up sampling of the subsampled R pixel values is performed horizontally to obtain the horizontal tentative estimate $\tilde{R}^{H}$.

In the step (ii), the color differences for horizontal and vertical directions. The horizontal and vertical color differences of the B pixel are calculated in the same manner.

In the step (iii), the horizontal and vertical color differences are smoothed and combined.

In the step (iv), obtain the interpolated G pixel value at the R or B pixel by adding the observed R or B pixel.

After the G image is interpolated, the GBTF algorithm interpolates the R and B pixel values by the standard color difference interpolation. Simply replace the color difference interpolation with the propose MLRI for the interpolation of residuals.

III. RESULTS

Compare the proposed algorithm with stateof the-art algorithms; alternating projections (AP), successive approximation (SA), local directional interpolation and nonlocal adaptive thresholding (LDI-NAT), and leastsquares lumachroma (LSLC). The proposed is implementing the GBTF algorithm because it is not publicly available. The other source codes are downloaded from the author's websites. The MLRI+wei. is the algorithm described in this paper, which introduces the weighted averaging of the GF. We evaluated CPSNR and S-CIELAB values, which are used in the representative survey paper. The comparison of CPSNR performance and S-CIELAB performance is evaluated. The result shows good performance to proposed algorithm than the existing algorithm. Fig. 2 shows the Comparison plot of CPSNR value for IMAX Data set with various algorithms. Also Fig. 3 shows the Comparison plot of S-CIELAB value for IMAX Data set with various algorithms.

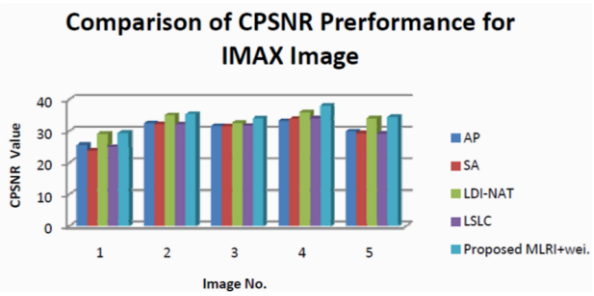

Fig. 2 Comparison of CPSNR value for IMAX Data set

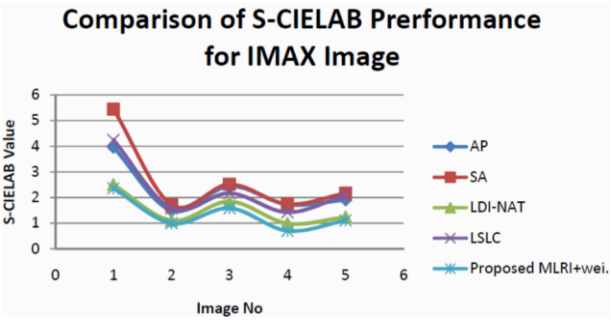

Fig. 3 Comparison of S-CIELAB value for IMAX Data set

IV. CONCLUSION

The proposed RI is an alternative to widely used color difference interpolation for color image demosaicking. It is experimentally showed that the interpolation accuracy is improved by reducing the Laplacian energy of the image to be interpolated. Based on this observation, the proposed MLRI which performs the interpolation in the residual domain with the minimized Laplacian energy, where the residuals are differences between the observed and the tentatively estimated pixel values. Then estimate the tentative pixel values by minimizing the Laplacian energy of the residuals by guided up sampling. Also proposed a novel demosaicking algorithm by incorporating the proposed MLRI into the GBTF algorithm, which is one of state-of the-art Bayer

demosaicking algorithms. The experimental results demonstrate that proposed demosaicking algorithm using the MLRI can offer state-ofthe-art results with reduced color artifacts for the IMAX and the Kodak. The computational time of proposed algorithm is reasonably fast and takes about 3.61 seconds for a 500 × 500 image in MATLAB implementation on Windows platform with i5 processor and 4GB RAM.

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TITLE
SOLAR VEHICLE for GREEN ENVIRONMENT

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ABSTRACT:
To overcome fossil fuels insufficient availability and make vehicles eco-friendly,Solar Power is utilized to run the Auto mobiles. By considering this, we have designed an ELECTRICAL VEHICLE which runs on SOLAR POWER. The vehicle is a three-wheeled drive that can be used as short distances shuttle. Since the Solar Based Vehicles will be the future of the automotive industry, it is necessary to design an Efficient & Economical Electric Vehicles.. This vehicle is an initiative in this direction

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SOLAR VEHICLE for GREEN ENVIRONMENT

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Abstract— To overcome fossil fuels insufficient availability and make vehicles eco-friendly,Solar Power is utilized to run the Auto mobiles. By considering this, we have designed an ELECTRICAL VEHICLE which runs on SOLAR POWER. The vehicle is a three-wheeled drive that can be used as short distances shuttle. Since the Solar Based Vehicles will be the future of the automotive industry, it is necessary to design an Efficient & Economical Electric Vehicles.. This vehicle is an initiative in this direction.

Index Terms— Eco friendly, Electric Vehicle, Solar Power.

INTRODUCTION

As both the Energy demand and Environment concern

increase dramatically in the past decade, it necessary to

Find Solution to tackle such problems. The Solar Vehicles Harness the Solar energy which is converted into Electricity. Thus formed Electricity is utilized to run the Vehicle, which will be Free of pollutant. The Solar Vehicle, The vehicle powered by the Sun, leads to Clean & Green Environment.

The Photovoltaic Cells, made of Semiconductors like Silicon, are widely used to convert Electricity from the

Solar Power. The group of Photovoltaic cells forms the Solar Panel.

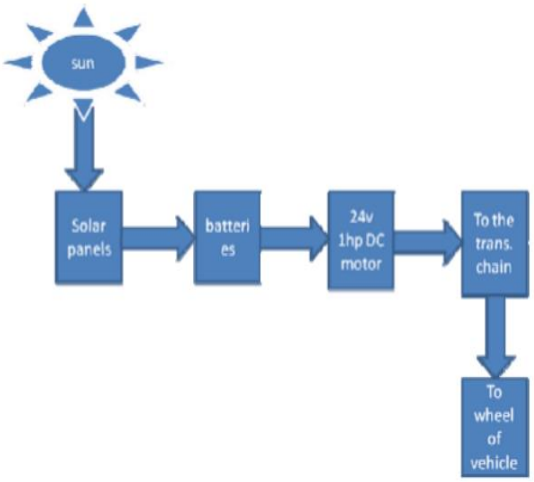


Fig 1.1

The fig 1.1 provides an overview of the process involved in the working of solar Power based Electric vehicle. For this Vehicles, the Solar insolation the Prime source of energy. The Solar Panels, the group of PV Cells with proper MPP Technique will generate the Electrical Energy.. The Electrical Energy obtained is used to Charge the batteries, which is used to run 24V DC Series Motor. The DC Series Motor is chosen as it has Very high Starting Torque. The shaft is used to Transmit the Power of the motor to the rear wheel of the vehicle.

The Proper Charging – Discharging Cycle of the Batteries are the most important concern. So the batteries are fully charged initially. And thereafter only, the Batteries are allowed to charge by the Solar panels output.

The Electric Vehicle is powered completely by the Solar Radiation. The Photovoltaic (PV) cells present in solar panels, convert the sun's energy into electric energy. Thus the Solar energy is used to power all the part of a vehicle for its propulsion.

Solar cars are powered by the sun's energy. The Major component of a solar Vehicle is its solar array, which collect the energy from the sun and converts it into usable electrical energy, The energy collected from the solar array is converted into the proper system voltage which will be fed to the Motor of the Drive. The Power Modulators such as converters adjusts the flow of energy to the motor, and then to the throttle. This Energy is used by the Motor to Drive the Wheel of the Vehicle.

COMPONENTS:

1. **SOLAR PANEL**
2. **BATTERY**
3. **DC MOTOR**
4. **WIRING SETUP**

5. FRAME SUPPORT

6. CHAIN

MANUFACTURING PROCESS:

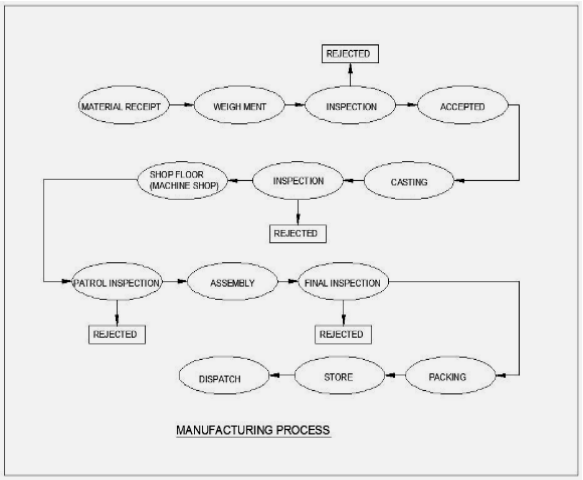


Fig 1.2

WORKING PROCESS:

PRINCIPLE OF WORKING OF DC MOTOR:

The DC MOTOR works on the principle laid in the FLEMMING'S left hand rule

SOLAR PANEL:

The Solar panels are used generate electricity by converting the sun's rays into energy. The car runs by using the energy that is stored in the batteries.

WIRING SETUP:

Electrical connections are made in series or in parallel to achieve a desired output voltage and/or desired current capability. The cells must be connected electrically to one another and to the rest of the system.

D.C. MOTOR (PERMANENT MAGNET):

An electric motor is a DC machine that converts electrical energy to mechanical energy. This conversion is based on the principle that whenever the current-carrying conductor is placed in a magnetic field, it experiences a magnetic force whose direction is given by Fleming's left-hand rule.

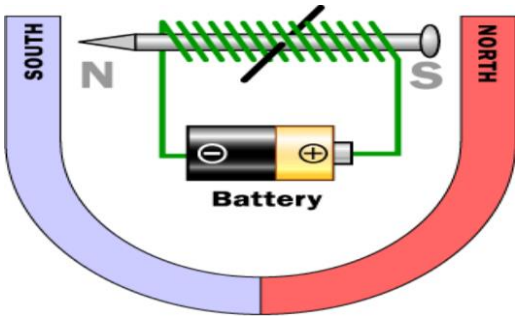


Fig 1.3

FRAME SUPPORT:

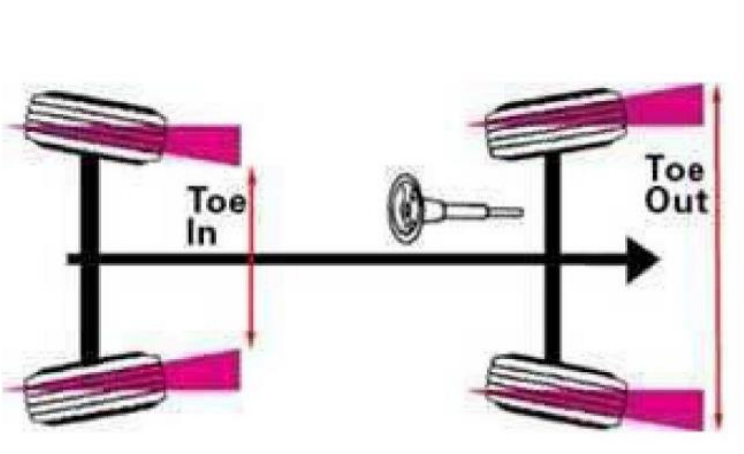
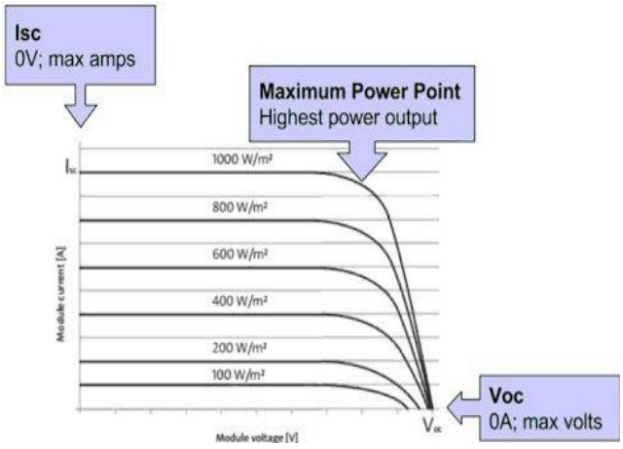


Fig 1.4

ANALYSIS:

Month	Electricity generated, supplied and excess electricity by the PV (kW)					Energy supplied to the inverter by the battery (kW)				Energy received by the inverter and supplied to the AC load (kW)			AC load (kW)
	Electricity generated	Charge the battery	Supplied to the inverter	Excess electricity generated	Losses	Battery alone	Battery with PV	Total supplied	Losses	Energy in	Energy out	Losses	
January	77.109	26.868	11.375	38.523	0.343	16.926	5.551	22.477	4.391	33.852	28.892	4.960	28.892
February	69.072	23.902	10.871	33.776	0.523	15.288	4.417	19.705	4.197	30.576	26.096	4.480	26.096
March	72.443	28.656	10.726	32.594	0.467	16.926	6.200	23.126	5.530	33.852	28.892	4.960	28.892
April	64.596	27.337	10.185	26.644	0.430	16.380	6.195	22.575	4.762	32.760	27.960	4.800	27.960
May	61.851	29.563	10.009	21.846	0.433	16.926	6.917	23.843	5.720	33.852	28.892	4.960	28.892
June	54.679	29.159	8.971	16.036	0.513	16.380	7.409	23.789	5.370	32.760	27.960	4.800	27.960
July	51.747	30.491	8.478	12.214	0.564	16.926	8.448	25.374	5.117	33.852	28.892	4.960	28.892
August	49.461	31.007	8.464	9.4810	0.509	16.926	8.462	25.388	5.619	33.852	28.892	4.960	28.892
September	52.154	30.789	8.047	12.956	0.362	16.380	8.333	24.713	6.076	32.760	27.960	4.800	27.960
October	59.964	30.055	8.890	20.615	0.404	16.926	8.036	24.962	5.093	33.852	28.892	4.960	28.892
November	66.798	30.044	9.457	26.581	0.716	16.380	6.923	23.303	6.741	32.760	27.960	4.800	27.960
December	74.212	29.061	10.936	34.161	0.054	16.926	5.990	22.916	6.145	33.852	28.892	4.960	28.892
Total	754.086	346.932	116.409	285.427	5.318	199.290	82.881	282.171	64.761	398.580	340.180	58.400	340.180

Motor voltage VS Motor current :



CONCLUSION

This project work has provided us an excellent opportunity and experience, to use our limited knowledge. We feel that the project work is a good solution to bridge the gates between institution and industries.

The "**FABRICATION OF MINI SOLAR VEHICLE**" is working with satisfactory conditions. As for this trailer is concerned in India, single piston arrangement is commonly used. Instead, with the same Piston arrangement available, repositioning the system with the help of the spur gears meshed normal to each other; the trailer can be lifted in the other two sides just by changing the position with the help of a motor connected with the battery.

Thus, we have developed a "**FABRICATION OF MINI SOLAR VEHICLE**" which helps to know how to achieve low cost automation. The operating procedure of this system is very simple. By using innovative techniques, this system can be modified and developed based on the human need in our day to day life.

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TITLE
COMPUTER AIDED SKIN DISEASE DETECTION AND CLASSIFICATION

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ABSTRACT:
Infections of Skin are becoming most common disease in this fast paced world. Due to increased number of Skin disease related cases there is need for automatic detection of skin disease is important

in Diagnostic & Therapeutic Application's, although there is a large amount of skin diseases images data and due to lack of quality in images it is very hard to classify the disease, with good accuracy. The paper elucidate about the process of automatic detection of skin infections, which mainly focused on classification of given image data into normal, cancerous & allergic. The input image is preprocessed then passed through a fully trained BPN network. Respectively it is compared with database using K-means for disease classification.

COMPUTER AIDED SKIN DISEASE DETECTION AND CLASSIFICATION

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Keywords: Tissue, BPN, K-means clustering.

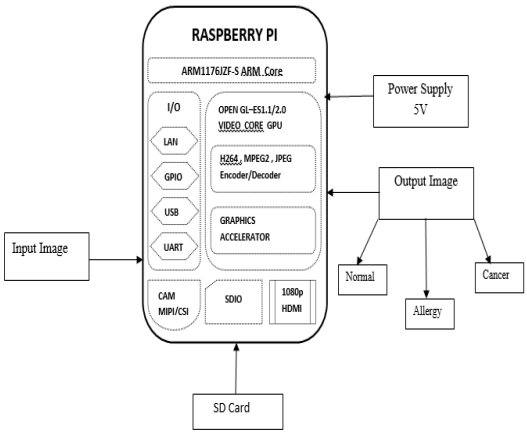
I.INTRODUCTION

The manual process for Skin disease diagnosis is very time consuming so we proposed a automatic skin diseases diagnosis using the neural networks and K-means clustering. Using this neural network tools we can diagnose a Skin allergy accurately with minimal time Consumption.Due to the variable shape and location of the neoplasm, BPNNs are used to overcome several object recognition and biological image segmentation challenges. As the BPNN functions over patches using kernels, it has the advantages of taking context into account and being used with raw data. The proposed method uses K-means clustering algorithms and Back propagation neural networks for classification of skin conditions like Skin cancer, skin allergy precisely. The Preprocessing for image data is done for converting the image into 2-D and additionally uses feature extraction. Clustering is done for grouping similar allergy and cancer part using K-means.

II. PROPOSED METHOD

The objective of this paper is to develop a automatic detection system that is capable of detecting skin lesions. The Back Propagation Network is used for classification of skin disease .K- Means clustering is used for structural analysis. The Internet of Things is regarded as the third wave of information technology after Internet and mobile communication network, which is characterized by more Recognition, more comprehensive interoperability and intelligence.

III. BLOCK DIAGRAM



The images of skin lesions are being taken and stored in database which is later extracted as per need and undergo image processing for identification and further diagnosis. Then the input image will go to raspberry pi kit where more images with their skin problems are already stored in the memory card present inside. The function of the kit is to compare the image and extract it in Gaussian, bilateral, grey, region detection filters

and segmented images. In this project we are using python language for image processing and calling function for the output image. In this system, a 5 volt power supply is being used either via USB port or an adaptor. The input images are processed to extract in order to get the desired result, i.e. allergy, cancer or normal skin.

IV. METHODOLOGY

PREPROCESSING AND NORMALIZATION:

Pre-processing is a common name for operations with images at the lowest level of abstraction, both input and output are intensity images. The aim of pre-processing is an improvement of the image data that suppresses unwanted distortions or enhances some image features important for further processing.

In image processing, normalization is a process that changes the range of pixel intensity values. Applications include photographs with poor contrast due to glare. Normalization is sometimes called contrast stretching or histogram stretching

FEATURE EXTRACTION:

Feature Extraction is a method of capturing visual content of images for indexing & retrieval. Primitive or low level image features can be either general features, such as extraction of colour, texture and shape or domain specific features.

GLCM:

GLCM defines the occurrence of the grey level pixel of an image. It is one of the simplest matrix methods to extract the texture features. This statistical approach provides useful information about the relative position of the neighbouring pixels in an image. Also, the gray-level co-occurrence matrix can reveal certain properties about the spatial distribution of the gray levels in the texture image. For example, if most of the entries in the GLCM are concentrated along the diagonal, the texture is coarse with respect to the specified offset. GLCM features are extracted for all the images in the database and images are sorted in ascending order, so that images with similar energy features as the input image are sorted.

BACK PROPAGATION NETWORK:

Back Propagation is a systematic method for training multilayer artificial neural network. It provides a computationally efficient method for changing the weights in a feed forward network, with differentiable activation function units, to learn a training set of input-output examples. The algorithm can be decomposed in the following four steps:
i) Feed-forward computation
ii) Back propagation to the output layer
iii) Back propagation to the hidden layer
iv) Weight updates.

K- MEANS CLUSTERING:

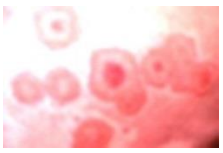
Finding evenly spaced sets of points in subsets of Euclidean spaces and partitions of these subsets into well-shaped, uniformly sized convex cells. Like the closely related k-means clustering algorithm, it repeatedly finds the centroid of each set in the partition and then re-partitions the input according to which of these centroid is closest. K-means clustering in that its input is a continuous geometric region rather than a discrete set of points.

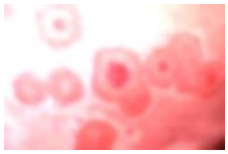
V.RESULT & DISCUSSION

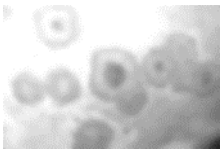
These are the output images which are sent to doctor's email ID for further diagnosis. These images are of the disease Tinea Pedis with the classification of image which describes Gaussian Image, Input Image, Gray Image, Regions Detected, Segmented Image,Extracted Image.

Sample:-

Input Image


Gaussian Image


Bilateral Image


Gray Image

Regions Detected

Segmented Image

Figure 4.1 - Erythema

VI. ADVANTAGES

- The features of the proposed system are, High accuracy of detection
- Segmentation of ROI is exact.
- The skin allergy
- It is useful to classify the skin allergy and cancer images for accurate detection.
- Detection of skin cancer at early stage.

VII.CONCLUSION

In summary, the automatic skin disease detection is performed using back propagation network. From the given input image the proposed algorithm detects the type of skin disease and the data will be send to the doctors for further analysis.

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TITLE
A COMPACT SIW BANDPASS FILTER FOR WIDEBAND UWB APPLICATIONS WITH SPLIT RING RESONATOR

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ABSTRACT:
In this Paper, wide band BPF is proposed using vertical array of vias in split ring resonator produces pass band of 3.1-10.6 GHz. The proposed filter results better return loss performance and wider bandwidth. Designed filter is simulated using ADS software.

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Abstract: - In this Paper, wide band BPF is proposed using vertical array of vias in split ring resonator produces pass band of 3.1-10.6 GHz. The proposed filter results better return loss performance and wider bandwidth. Designed filter is simulated using ADS software.

Key Words- bandpass filter, UWB, pass band.

I. Introduction

The Federal Communications Commission (FCC) release the frequency band 3.1 - 10.6 GHz in early 2002. Ultra Wideband (UWB) technology offers high data rates, low-power transmissions, low cost, excellent range resolution (geolocation) capabilities in the research community and in industry. UWB filters have lower insertion loss, good return loss performance, good selectivity and better rejection performance. A new design of wideband microwave bandpass filter based on inter coupled split-ring resonator is designed for frequency range from 10-17GHz[5]. A compact planar bandpass filter using two stubs is proposed for UWB applications shows good return loss performance and sharp selectivity. Microstrip stopband bandpass filters are proposed using two shapes of split ring resonator(SRR) [12].In ref [8], splitting resonator is used as multimode resonator through inter digital coupled lines is designed for UWB applications.

In this paper, novel UWB bandpass filter is realized using split ring resonator. A microstrip transmission line is attached with the split ring resonator. Here, vertical array of vias are placed in the stubs of the split ring..

2 . Modeling of Substrate Integrated Waveguide

Substrate integrated waveguides (SIWs) are integrated waveguide like structures fabricated by using two rows of metal vias embedded in a dielectric that connect two parallel metal plates. The rows of metal vias form the side walls. This relatively new architecture has the properties of both micro strip line and waveguide. Its manufacturing process is also similar to other printed planar architectures. A typical SIW geometry is illustrated in Fig.1, where its width (i.e., the separation between the vias in the transverse direction (as)), the diameter of the vias (d) and the pitch length (p) are the most important geometrical parameters (as shown in Fig.1) that are used for designing SIW structures as will be explained in the next section.

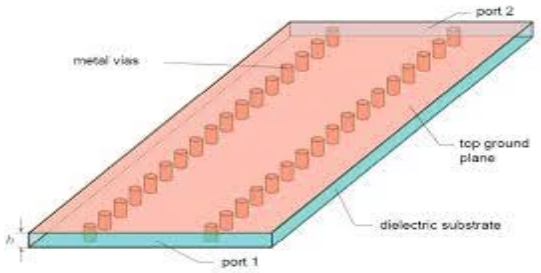

Fig.1.Substarte integrated waveguide(SIW)

A SIW-BPF is analyzed for different via diameters, by varying the via diameter(d) the pitch ratio of the filter is altered (d/p), variation in the pitch ratio affects the filter performance , so anlaysis based on the performance of the filter for different pitch ratio is performed and results corresponding to it are compared , it is seen that when the pitch ratio is slightly increased the performance is improved , but the range for pitch ratio is kept fixed for every cut-off wavelength and frequency of operation. For operation of the filter in higher frequency the range lies between 0.4mm and 0.8mm.

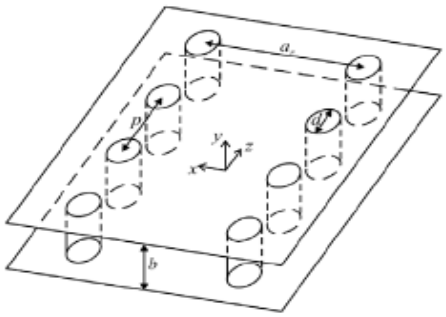

Figure 2 : Via Diameter And Via Seperation

- p-period between vias

- d-diameter of vias
- b-height of substrate
- d/p=0.4-0.8

3. Design of UWB BPF for UWB(3.1-10.6 GHz)

A single Split ring resonator has a pair of loops andstrong couplings are desirable. The small gap between the stubs produces large capacitance values. Strong coupling determines every half-wavelength resonators are intercoupled with adjacent resonators to form split-ring structures along half of their length. Therefore, the quarter-wavelength coupling length (a) that consisted of split-ring resonator determines the center frequency (f) of the pass band region.

$$a = \frac{\lambda_g}{4} \quad \text{.....} \quad (1)$$

Where, $\lambda_g = \frac{c}{f\sqrt{\varepsilon_{eff}}}$ (2)

The split ring resonator band pass filter has low radiation losses and high quality factor. The Surface current distribution of bandpass filter is shown in Fig1. This wide band bandpass filter are proposed and analyzed on FR4 substrate with thickness 1.6mm and dielectric constant of 4.4.

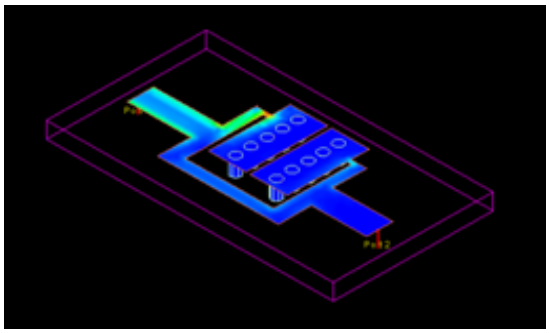

Fig.3. Surface current distributions of bandpass filter using vertical array of vias.

The layout of novel compact bandpass filter using split ring resonator produces a notch band and act as a bandstop filter as shown in Fig.5. By adding vertical array of vias in the split ring resonator produces wide band frequency ranges from (3.1-10.6). The BPF is designed using split ring resonator to provide more transmission zeros in the pass band and lower insertion loss. Figure 3 shows the configuration of the novel compact BPF using vertical vias. The simulation result of the pass band is mainly determined by the vertical array of vias in the resonator and the frequency of the pass band is further tuned by T stub in the input and output coupling. Here via diameter is D=1mm and the gap between vias is G_1= 0.5mm.The proposed filter structure is operated at UWB range (3.1-10.6GHz).

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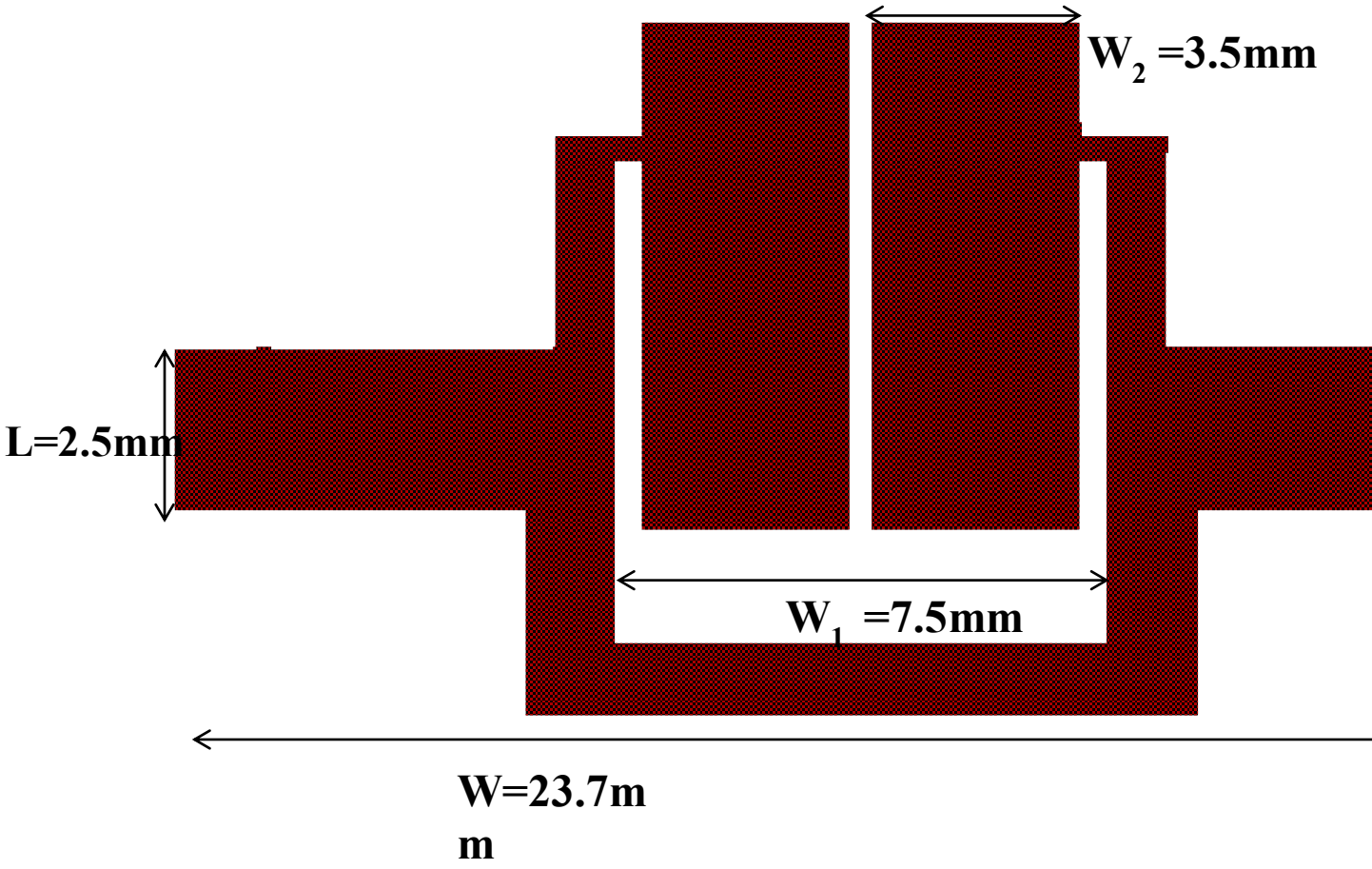

Fig.4. Configuration of Proposed UWB Band pass filter without vertical array of vias.

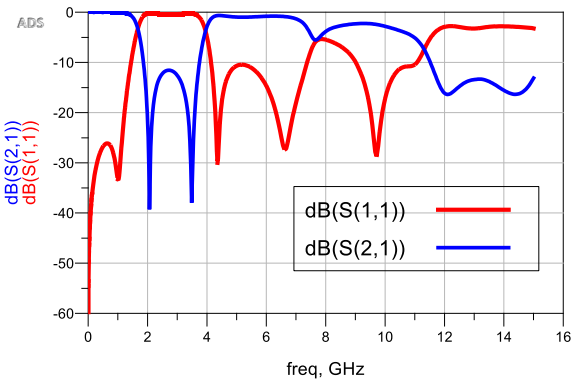

Fig.5. Simulated Result of SIW Band pass filter.

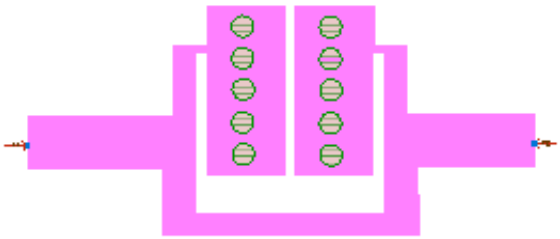

Fig.6. Configuration of Proposed UWB Bandpass filter with vertical array of vias.

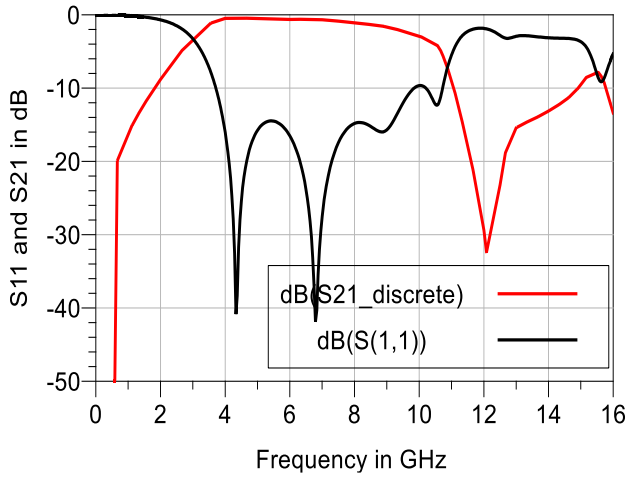

Fig.7. Simulated Result of SIW Band pass filter using vertical array of vias.

using vertical vias in split ring resonatorproduces attenuation about -42dB and obtain wide band characteristics. This produces a complete ultra wide band range of 3.1-10.6 GHz frequency range, return loss achieved about -39dB, as shown in Fig.4. Dimensions of UWB BPF are shown in Table I.

4. Conclusion

Wideband bandpass filter is proposed and demonstrated for UWB applications. Using vertical array of vias in the split ring resonator produces more transmission zeros with better stopband rejection and compact size. The topology design comprises of UWB BPF is designed using split ring resonator produces return loss about -40dB and better stopband attenuation about -42dB operated range of (3.1-10.6 GHz) for UWB range of frequency.

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TITLE

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AUTHORS
Sundeep.P.S, Lakshmi Rajan, Karthika Venugopalan, Asst.Prof.M.Gokilavani

ABSTRACT:

Melanoma is one of the most unpredictable and difficult environments to diagnose due to its complexity. It becomes important to identify these diseases at their initial stage to control it from spreading. Traditional approaches for early detection of melanoma by dermatologist to manually measure a skin lesion using the ABCDE (Asymmetry, Border-irregularity, Color variation, Diameter, Evolution) conditions before confirmation can be done through biopsy or pathologist. The main objective of the project is to identify various skin ROI (Region of Interest) at their initial stage whether its melanoma or non-melanoma to treat it very easily. In this project authors proposed an early detection of skin melanoma using Android application and image processing techniques by android Studio software and openCV library in Tenser Flow object Detection using API. To evaluate the detection performance, the detection process has been achieved using two different datasets on a real-time mobile application of Android camera, and Tensor Flow Object Detection Application Program Interface (API). Experimental results reach 96.3% of detection accuracy for Benign and 89.2% accuracy for malignant dataset. The experiments have been executed on windows 7 with Google Colab, OS configuration with API level 23.The result and discussion is more reliable when the lesion of skin cancer images are geographically distinct.

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Keyword: *Melanoma, Skin lesion, openCV library, Tenser Flow object detection using API, Android.*

I. INTRODUCTION:

Skin cancer is the most common form of cancer, with more than 3. Million cases affecting more than two million people each year, according to the skin cancer foundation. Early detection of skin cancer leads to 5-year survival rate for patients in the US. The survival rate drops to 63% if the disease reaches the lymph nodes and 20% if it spreads to distant organs **[4].** Skin cancer organize a lesser but important quantity of patients with cancer. Even though the presence of eumelanin in dark skin is protective against the growth of skin cancer, it is gradually being diagnosed in the Indian population **[1].** There are two main types of skin cancer: melanoma and non-melanoma.

Figure 1: Types of skin cancer

The most common non-melanoma tumours are basal cell carcinoma and squamous cell carcinoma. In India, skin cancers constitute about 1-2% of all diagnosed cancers. Basal cell carcinoma is the commonest form of skin cancer worldwide **[2, 3]**, but various studies from India have consistently reported SCC as the most prevalent skin malignancy.

In primary skin cancer, diagnosed is usually by a visual examination. If a suspicious spot is found, the area, size, shape, color and texture, as well as any bleeding or scaling. Lymph nodes to see whether they are enlarged. The two most common types of tests used in diagnosing skin cancer are biopsies and imaging tests. Primary stage detection of melanoma needs computer aided detection, in order to assist dermatology, produce the right diagnosis and treatment.

Generally, dermatology use biopsy method for examination to diagnosis presence of skin cancer. Skin biopsies at early stage are necessary to identify Melanoma. Biopsy is a procedure to removal or scrapping off the skin. Then this skin samples are undergone various laboratory test. Thus, this process is time consuming and painful. It may cause rise of medical costs for doing skin biopsies unnecessary. Nowadays, medical field depends

more on computer-aided diagnosis. This is the great option to distinguish melanoma without increasing the number of biopsies. Computer-aided diagnosis tool will help to increase the diagnosis accuracy as well as the speed, by applying Image Processing techniques. Therefore, automatic diagnosis tool is necessary for dermatologist.

A. Contribution:

In this journal, we propose an Android Application for melanoma using ABCDE Rule based on mobile device. The detection using an Android camera to take lesion image and process it too. The Accuracy of weighted score yields under the total dermoscopic score or TDS basics. Basically Diagnosed tool is able to extract various features of skin lesion such as color, types of dots, pigmentation, size of mole, deficiency details, multiple lesion details, area which is selected for cropping etc. However input to the diagnoses tools are skin lesion images only. After analysis of the various skin lesion which is given as an input, lesion are classified under the category of Melanoma or non-melanoma. The basics steps in processing skin lesion image for diagnosis of melanoma are pre-processing, image segmentation, feature extraction and classification of skin lesion. In the following section we discuss detailed each step and methods involved in skin cancer diagnosis.

II. ABCDE RULE FOR MELANOMA:

The lesion identification of various skin area based on basics skin cancer features. The proposed work is based on the feature extraction of ABCD rules include Asymmetric, Border thickness, Color of the mole, Diameter of the mole and Evolution of the symptom. Back propagation neural network is used as classifier. Melanoma is the most dangerous skin cancer. Reduction of the cost rather than ordinary system and spend less time to detect cancer. In this frame work, an automated melanoma prescreening system is proposed to diagnose melanoma skin cancer using modified TDLS algorithm and Support Vector Machine (SVM) **[9]** is used for classification. Segmentation of skin lesion from the surrounding skin in the dermoscopic images by using Neural Network segmentation algorithm. Different segmentation techniques were applied to the dermoscopic images to segment the skin lesions and evaluated with 3 different metrics, namely sensitivity, accuracy and border error. Segmentation **[10]** performance shows that Neural Network based lesion segmentation has high sensitivity, accuracy and less border error. For better performance in the classification step, in addition to the smartphone, a computer was also used. This application is user-friendly and the calculated Accuracy, Sensitivity, and Specificity are 95%, 98%, and 92.19% on average, respectively. It should be noted that these results are more reliable when the lesions are geometrically distinct **[5].**A simple algorithm is used to detect the skin cancer. Detecting melanoma using ABCD rule which is including in the methods of dermoscopic and using STOLZ Algorithm to given weight in detection. The result of this application shown value TDS and classification hypothesis suspected melanoma or normal mole from cameras smartphone used **[6].** Another method extends the ABCD rule to incorporate the evolution of the lesion (E parameter) by adding the patient's description of lesion change (e.g., enlargement, elevation, and color change) **[7, 8].** Although the ABCDE rule has been validated in clinical practice, no randomized clinical trials have shown that there is an improvement in the early detection of melanoma **[7].** In addition, image acquisition methods have also been developed to differentiate the amount of light absorbed, transmitted, or backscattered by the melanin content of the lesion. A technique for early detection skin cancer problem is proposed. The diagnosing methodology use Digital Image Processing Techniques and Artificial Neural Networks for the classification of Malignant Melanoma from other skin diseases. Dermoscopic images were collected and they are processed by various Image processing techniques. The cancerous region is separated from healthy skin by the method of segmentation. There are several problems like accuracy in the existing works. In this frame work are used to get better accuracy than others.

III. METHODOLOGY:

The environment will build by using the Android camera, OpenCV tensor Flow API and, ABCDE Rule. Figure 2 show the basis steps to diagnoses the skin cancer.

Android camera is an important communication device for this system to upload various skin lesion image from dataset. Preprocessing to make lesion only ROI (Region of Interest) from the skin lesion. The largest active contours it finds major spot on the image and removes the small spot. So only lesion will be processed. The result from the largest spot can be automatically crop only lesion skin so remove the entire area not used on the lesion. The main feature is ABCDE rule which is Asymmetry (A), Border (B), Color(C), and Diameter (D), Evolution (E). This part is important to determine the suspected melanoma.

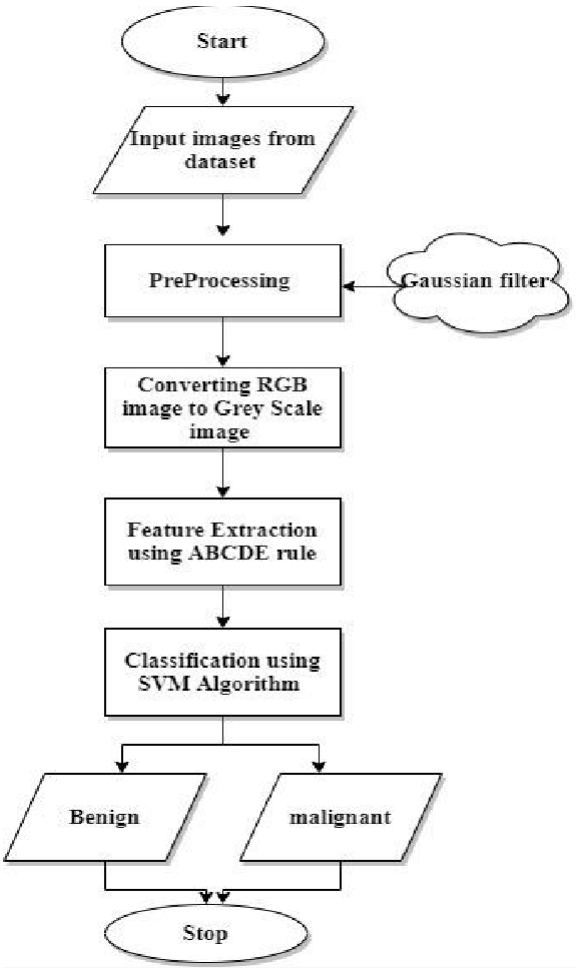

Figure 2: Skin Cancer diagnosis basic steps using Image processing

A. Image database:

The accuracy of the proposed system is based on the skin lesion images from international skin imaging collaboration ("ISIC Archives", 2016).Specially ISIC 2016 dataset consists of 900 images with ground truth segmentation. The database is generated by collecting images with known category (Benign/Melanoma). These websites are specified for melanoma skin cancer.

B. Preprocessing:

Preprocessing is the basic step in medical image processing to improve the quality of the digital image. Initially, the quality of skin images had to be enhance by filtered to remove unwanted hairs, air bubbles, ebony frames and reduce noises. This noises may cause inaccuracies in classification process [12]. Fig. 3 shows

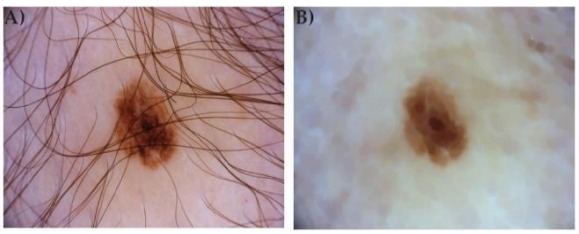

Figure 3: (A) Original skin lesion image from ISIC dataset. (B) Preprocessing image after the hair removal From ISIC16 dataset.

Gaussian filter is used to apply smooth our images more and make it easier to process. The equation of the Gaussian filter for two dimension is:

$$G(x, y) = \frac{1}{2\pi\sigma^{2e}} \frac{x2+y2}{2\sigma^2}$$

remove of unwanted hair using morphological methods, curvilinear structure detection, dull razor software, etc. This is to avoid misclassification.

Where *x* is the distance from the origin in the horizontal axis, y is the distance from the origin in the vertical axis and σ is the standard deviation (sigma) of the Gaussian distribution. In proposed algorithm, the Gaussian function is applied to 15 x 15 pixels with sigma set of three pixels. The Gaussian filter sets each pixel to the weighted average of its neighbors, with the central pixels receiving more weight than the outermost pixels. Giving more weight to the central pixels result in gentler smoothing g than a normal weighted average. The resulting image blur removes small objects but preserve boundaries andedges.

C. Image Thresholding:

The pre-processing image is then color thresholding to remove all skin-like pixels. Thresholding is the process where pixels within a specific range of hue and saturation values are labeled as "not-skin", and the intersection of these two not-skin pixels masks in found. The hue and saturation (HS) color channels are instead of the RGB color channels due to inherently large variance of pixel intensity of the lesion in the RGB channels.

$$\boldsymbol{Mean = sum}\ ((\boldsymbol{i}, \boldsymbol{j}))/(\boldsymbol{r} * \boldsymbol{c})$$

$$\boldsymbol{Standard\ Deviation\ SD = \sqrt{variance}}$$

The median and standard deviation of the entire set are then computed. The median is used instead of the mean because using the median ensures that any outlier lesion pixels sampled do not affected the range of intensities calculated, so non- skin pixels mistakenly sampled do not affect the computation. The trained threshold values are then validated on the remaining 50 images in the training data. The accuracy measure is taken

after connected component analysis and based on whether the correct object has been identified as the lesion. [13].

D. Feature Extraction using ABCDE rule:

In proposed system feature extraction is completely depend upon "ABCDE rule". Once the skin lesion infected area is identified the feature of skin has to be extracted. These features are classified as whether the lesion is melanoma or normal skin infection. Internal features are obtain by some attributes Gray Level Co-Occurrence Matrix (GLCM) [14] which the parameters like instance correlation, energy, homogeneity, mean, entropy, distribution, standard deviation. Etc. ABCD rule-based detection in 1985, to identify melanoma in the premature stages, the group from New York University designed the ABCD approach (asymmetry, Border, color variegated, diameter > 6mm). It is the easiest technique utilized for the detection of skin cancer.

i. **Asymmetry-** During this process, ABC checks the symmetry of lesion. If the value is 0 means lesion is symmetric, if the value is 2, the lesion is asymmetric and considered as cancerous.

ii. **Border Irregularity-** The border of the lesson is checked. Most of the edges of the cancerous lesion are ragged, gaps or blurred in such cases the values are lies between 0 -8.

iii. **Color:** The cancerous lesions appear in a number of colors such as white, red, light brown, dark brown, slate blue and black with value ranges from 0 – 6.

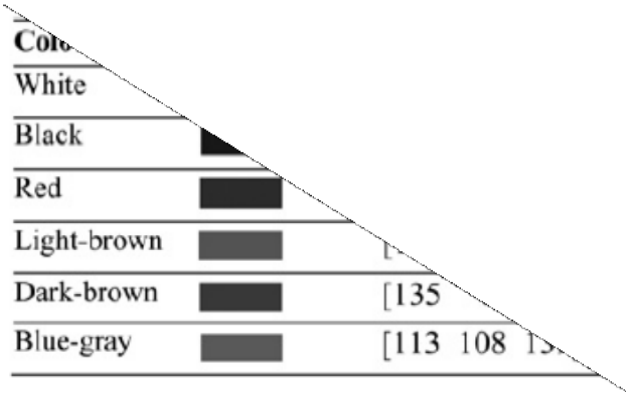

Figure 4: various melanoma colors

iv. **Diameter-** The diameter of cancerous lesions is more than 6mm and the values range from 0 to 5.

D. Classification:

Once the features have been obtained, we have had to choose what classifier to use. There are several well-known classifiers as Instance based classifiers, support vector machine(SVM), Discriminant analysis, Convention Neutral Network (CNN), Decision Tress, Logistic Regression, Ensemble Classifiers, Bayesian Network and other Classifiers. Classifier is used to classifying malignant melanoma or benign melanoma.

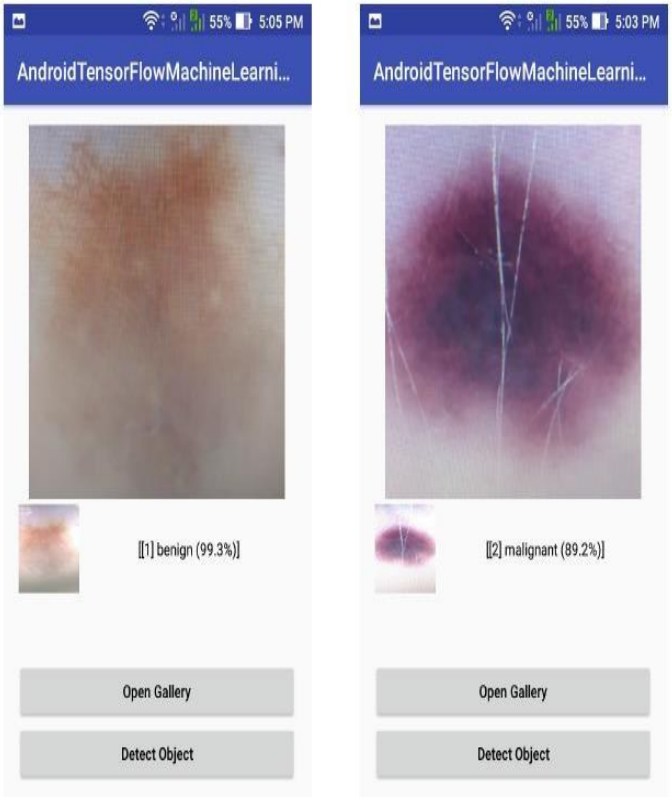

Figure 5: classification result using CNN (Melanoma Cancer)

Today Deep learning is very popular in the modern era. Deep learning is one of the best techniques for image classification. Based on the texture features we are training the dataset for classification. Here first we are giving Extracted feature to the neural network for checking performance of image classification then we are using CNN (Convolutional Neural Network) it is one of the deep learning techniques for classification, Dermoscopic images classification is done in two categories Melanoma and Non-Melanoma, it is done by using automated extracted features by CNN images.

In this step, we are passing Preprocess Images to the CNN classification. In this system, we have used resent 50 pre-trained convolution layer for training new dermoscopic images. DAG Network properties of the pre-trained network indicate, nnet.cnn.layer.Layer Layers with 192X2 connections.

IV. RESULT AND DISCUSSIONS:

After obtaining the values the four criteria, the TotalDermoscopy Score is calculated based on the following formula where each one of the presented with weighting factor.

Criteria	Score	Weight factor
1. Asymmetry(A)	0-2	1,3
2. Border(B)	0-8	0.1
3.Color(C)	1-6	0.5
4.Diameter	1-6	0.5

Table 1: Table weight each criteria on ABCD rule

Each criteria calculated using Total Dermoscopic Score (TDS).4

$$TDS = A * 1.3 + B * 0.1 + C * 0.5 + D * 0.5$$

For final diagnosis result, classification is done using TDS table

Total Dermoscopic Score (TDS)	Classification
<4,75	Benign Melanocyte lesion
4,75-5,45	Suspicious lesion
5,45	Highly lesion suspicious for melanoma

Table 2: Final classification table of TDS

For this experiment we used android phone with Samsung Tab S (8 MP). The testing using a digital clinical image medical dataset from PH2 - A dermoscopic image database for research and benchmarking and International Society for Digital Imaging of the Skin with histologic diagnosis. There are 40 images for testing with detail 20 images benign and 20 melanoma. We compare from taking a picture from printed picture each android.

A. Testing only Benign dataset:

S.No	Image Name	Final Value that's satisfied TDS Score in Samsung Android Phone	Status skin les based o TDS va
1.	*Image_1*	*4.56*	*TRU*
2.	*Image_2*	*3.59*	*TRU*
3.	*Image_3*	*5.69*	*TRU*
4.	*Image_4*	*5.66*	*TRU*
5.	*Image_5*	*3.81*	*TRU*
6.	*Image_6*	*4.58*	*TRU*
7.	*Image_7*	*4.12*	*TRU*
8.	*Image_8*	*3.83*	*TRU*
9.	*Image_9*	*5.65*	*TRU*
10.	*Image_10*	*3.84*	*TRU*
11.	*Image_11*	*4.7*	*TRU*
12.	*Image_12*	*3.8*	*TRU*
13.	*Image_13*	*5.58*	*TRU*
14.	*Image_14*	*5.69*	*TRU*
15.	*Image_15*	*5.58*	*TRU*
16.	*Image_16*	*2.93*	*TRU*
17.	*Image_17*	*3.73*	*TRU*
18.	*Image_18*	*3.89*	*TRU*
19.	*Image_19*	*3.89*	*TRU*
20.	*Image_20*	*5.16*	*TRU*

Table 3: Result compare with benign skin lesion dataset

B. Testing only Malignant dataset:

S.No	Image Name	Final Value that's satisfied TDS Score in Samsung Android Phone	Status skin le based TDS v
1.	*Image_1*	*5.68*	*TR*
2.	*Image_2*	*4.03*	*FA*
3.	*Image_3*	*6.29*	*TR*
4.	*Image_4*	*7.29*	*TR*
5.	*Image_5*	*4.19*	*TR*
6.	*Image_6*	*6.45*	*TR*
7.	*Image_7*	*5.89*	*TR*
8.	*Image_8*	*4.01*	*FA*
9.	*Image_9*	*4.93*	*TR*
10.	*Image_10*	*5.44*	*TR*
11.	*Image_11*	*4.96*	*TR*
12.	*Image_12*	*4.84*	*TR*
13.	*Image_13*	*5.65*	*TR*
14.	*Image_14*	*6.69*	*TR*
15.	*Image_15*	*4.87*	*TR*
16.	*Image_16*	*3.24*	*FA*
17.	*Image_17*	*4.85*	*TR*
18.	*Image_18*	*4.45*	*FA*
19.	*Image_19*	*5.89*	*FA*
20.	*Image_20*	*3.58*	*TR*

Table 4: Result compare with melanoma skin lesion dataset

The result from Table 4 given false classification of melanoma for few images. The causes of the error are due to the color in figured too dim and difficult to capture and processed with *OpenCV* too. In the criteria android phones make different result especially on the different crop from range color. By comparing the accuracy of Neural Network tool and convolutional neural network. By using CNN, we are getting accuracy averagely 96.3% for benign cases and 89.2% accuracy for melanoma dermoscopic images.

V. CONCLUSION:

ABCD rule is the *dermoscopy* method can detect melanoma with three classifications. This paper proposed a method to detect melanoma using a mobile device. The image for data test is taken from digital clinical image medical PH Dataset Melanoma and International Society for Digital Imaging of the Skin with histological. With the ABCD rule method. It can detect melanoma cancer from printed image and different accuracy result happens from different sensor image. The high accuracy from an android which using CMOS Image Sensor. Color range from each sensor makes different crop result. The dim color made false classification because dim color difficult to catch the color. The proposed system successfully detects and classifies the skin cancer from images. At the end of the system, you can say that the system achieves its expected expectations. The proposed system test 50 types of images and obtains the result where the overall success rate of the system is 96.30% for benign and 89.2% malignant skin cancer which meet the expectation of the system. In future, this technique can be used in the detection of brain tumor, breast cancer, prostate cancer, lung cancer etc.

In future, the future work will be based on developing algorithm to identify the various skin cancers with its type and to improve the overall efficiency and to reduce the computational time. Take more features in future to get more accuracy and other additional steps.

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TITLE

Driver Drowsiness Detection in Real Time Scenario Using a Logistic-Regression-Based Machine Learning Algorithm

Authors:
Vijay.J, Sai Krishna, Md. Thazeem, Jeremiah

ABSTRACT:

The number of car accidents due to driver drowsiness is very steep. An automated non-contact system that can detect driver's drowsiness early could be lifesaving.Motivated by this dire need, we propose a novel method that can detect driver's drowsiness at an early stage by computing heart rate variation using advanced logistic regression based machine learning algorithm. Our developed technique has been tested with human subjects and it can detect drowsiness in a minimum amount of time, with an accuracy above 90%.

Key Words—Driver drowsiness detection, electrocardiogram, heart rate variation, machine learning

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Driver Drowsiness Detection in Real Time Scenario Using a Logistic-Regression-Based Machine Learning Algorithm

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***Abstract*: The number of car accidents due to driver drowsiness is very steep. An automated non-contact system that can detect driver's drowsiness early could be lifesaving.**

Motivated by this dire need, we propose a novel method that can detect driver's drowsiness at an early stage by computing heart rate variation using advanced logistic regression based machine learning algorithm. Our developed technique has been tested with human subjects and it can detect drowsiness in a minimum amount of time, with an accuracy above 90%.

Key Words—Driver drowsiness detection, electrocardiogram, heart rate variation, machine learning

1.INTRODUCTION

The increasing number of car accidents due to driver drowsiness has been a challenge for many authorities and automobile companies. The National Highway Traffic Safety Administration's (NHTSA) report [1] indicates that in 2009 over 70,000 car accidents were caused by driver drowsiness, out of which 700 of them resulted in fatalities and 36,000 of them resulted in injuries, excluding crashes not reported.

Drowsiness can be caused by sleep loss, low circadian rhythm, and driving for an extended period of time. In order to detect drowsiness in early stages, there have been many methods developed with the help of sensors mostly associated with many different physiological signals such as electrocardiogram (ECG) and others. Current research included studies that record and analyze a driver's linking pattern and studies that monitor brain electrical behavior to detect driver drowsiness. In our research, the focus is on ECG signal variation in transition to drowsiness and detection of the changing ECG signal behavior to accomplish high accuracy in less time.

In order to implement a drowsiness detection system, a hardware and software system capable of detecting electrical signals generated by the heart in real time and predicting the states of drowsiness needs to be designed. A hardware system was designed to detect an ECG signal, amplify the ECG signal and to remove unwanted noise. The challenge was to detect the drowsiness in the lowest possible amount of time for the safety of the driver. Our goal is to detect drowsiness in a few seconds, after the driver starts driving, while maintaining a level of accuracy above 90% [18]. It was suggested that measuring the ratio of low frequency to high frequency of the heart rate variation (R complex peak to the next R complex peak) as an indicator for drowsiness would be effective. However, due to the fact that average heart beat is approximately 90 beats per minute, there is minimum of 5 minutes of ECG data that is required to extract at least three hundred peak to peak detection to evaluate driver drowsiness [10]. This is too long of a period where there is no detection of drowsiness, during which a driver could find himself or herself in a hazardous scenario before the required data has been gathered. We suggest implementing a system based on non- contact ECG sensors to detect the electrical signal from the heart. We suggest different material such as Silver (Ag) or AgCl for the surface of non-contact sensors in order to maximize the signal-to-noise ratio. Since a driver does not always wear the same clothing material, the impedance matching between the body sensors and the clothing varies. This variation in material of clothes leads to more noise and a lower ECG amplitude. The challenge to increase signal to noise ratio was addressed in and authors proposed implementing a differential amplifier and reducing noise with a feedback technique called driven-right-leg (DRL). Adding a set of adaptive filters to remove the baseline noise in order to receive a clean ECG signal is suggested in. Effective noise removal techniques deliver a clean ECG signal to the processor and increase accuracy, therefore minimizing detection time.

In this paper, a novel driver drowsiness detection technique is proposed which employs logistic regression method based on the machine learning approach. Our proposed approach contains the following attributes x Lowering detection time: By developing a unique algorithm for each person, a small window of an ECG signal suffices for early detection.

x Increasing accuracy: The algorithm detects outlier data and removes them before detection, thereby increasing accuracy.

x Detecting drowsiness probability: The algorithm determines the likelihood of drowsiness.

ECG is a low frequency signal; therefore, extracting information from it could potentially take a long time. A healthy person's heartbeat is between 70 to 90 beats per

minute (bpm), making it very difficult to extract the ECG peak-to-peak time series signal in a few seconds. Thus, detecting driver drowsiness in real time is a critical issue. To address the challenges mentioned above, and to implement a hardware architecture, developing a robust system is required:

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x Establishing a unique algorithm in few training sets for any specific person.
x Detecting the early sign of drowsiness in as few as 10 to 15 seconds.
x Recording the accuracy of the measurement and self-correction of the algorithm if accuracy drops below certain threshold.

Logistic regression method was implemented to improve the effectiveness of drowsiness detection algorithm. In [21] the authors suggested multilayer neural network using each five peak to peak readings from the ECG. Authors tested ECG data for 6 different sets and obtained 90% accuracy. It has been suggested that by adding more layers to the neural network and collecting more data, the accuracy could be increased. In [25] the authors tested two runs with Naïve Bayes and Support Vector Machine with time-domain features such as average signal over a time period.

This paper is organized as follows: in section II we describe our proposed drowsiness detection system briefly. The new architecture is based on machine learning systems. The system detects drowsiness in approximately less than 20 seconds after the subject starts driving and also maximize the data accuracy at over 90%. Section III details the algorithm that is being employed followed by the conclusion which is the final section.

II. PROPOSED SYSTEM

In this section and followings, we will detail our proposed hardware and machine learning-based algorithm to detect drowsiness. The system is based on heart rate variation time series detection and extracting. According to [19] frequency domain consists of four major intervals, (Ultra-low frequency, very low frequency, low frequency, and high frequency). The low to high frequency ratio drops with drowsiness [18]. Extracting low and high frequencies from a time series using Short Fourier Transform (STFT) is a timely process and accuracy is affected by noise and the algorithm accuracy. Due to the importance of driver mobility, a non-intrusive drowsiness detection system is required. Our proposed system is broken down into three main parts, hardware infrastructure, software design, and algorithm development.

A. Hardware architecture

In the medical field, ECG is a type of electrical signal derived from automatic heart chemical recombination, generating different electrical potential voltages [23]. Usually, these electrical signals are detected with electrodes directly attached to a person's chest. However, for our purposes, it is important that the driver to maintain his or her freedom or mobility and not have any attached sensors or wiring while driving. To this end, Yong [7] suggests placing non-contact ECG sensors on either the seat back or the seat belt of the driver. Additionally, the driver's clothing will be between the sensors and the driver's skin; thus, various types and thicknesses of material will add undesirable noise to the ECG signal. In order to analyze the signal, it is imperative to remove all noise from the ECG signal and derive accurate information from the clean ECG signal, only the data actually generated by the driver's heartbeat. The output from the aforementioned non-contact sensors is a low voltage (mV) signal. Amplifying the signal is necessary for extracting information [19]. In [7] the author suggests that a differential amplifier with two non-contact sensors would increase the gain, as would also adding a feedback technique (DRL). In both ways, the noise effects can be reduced. The feedback technique is implemented by inverting the output of the differential amplifier and connecting it to the driver's body. Also, noise generated by power lines that run alongside some road and major highways must be removed with a notch filter.

Since the sensors are non-contact, they generate a lot of noise in a wide range of frequencies, from fractions of a Hertz (Hz) up to one hundred Hz [22]. In this research, we remove both the higher noise frequencies and the DC noise components with hardware filtering. Figure 1 shows different hardware stages in our implementation. In [7] the author suggests using 510 times voltage amplification, five high pass filters, and a

35 Hz low pass filter to remove a majority of this noise. In [9]
of a driver. Different sensor placement around the driver's body generates different levels of noise due to the distance from heart.
In the next step, a combination of micro-controllers and A/D convertors generates a discrete ECG signal and prepares the data for the software stage. Since the signal is low frequency,
it is better to use a processor with a low frequency sampling rate. In this experiment, two A/D converters are used. An Arduino with a 10 kHz sampling rate and a Beagle Bone Black with a 200 kHz sampling rate are tested. However, using a higher frequency increases the memory storage size.

B. Software design

The primary focus of software development is to calculate the
time series between every two consecutive R complex peaks and then store this data. However, if environmental noise still
exists after this process while detecting peak for R complex, particularly in the same HRV frequency range, then the software can pick out a wrong peak, such as S wave instead of the R wave, as demonstrated in Figure 2. Hardware filters help to remove noise in higher frequency ranges and the DC component. However, noise in the same frequency range as HRV survives in the hardware filtering stage. In general, any
noise would distort the ECG signal and can affect the peak to
peak (RR) readings, erroneously detecting wrong peaks. For

Fig. 1. Hardware design.

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example, the S complex could be lifted up and then the next peak reading would be an S complex peak. [4]
In order to clean the ECG signal, we chose the least means square (LMS) adaptive filter method with an LMS algorithm
[19]. This method removes the noise within the same frequency range which is mixed with the ECG signal. This algorithm's digital Finite Impulse Response (FIR) filter with adjustable weights filters out all noises with the deepest gradient method [5]. In Figure 3, there are two inputs, discrete
function s(n) plus noise n(k) and correlated noise n(k).
The FIR filter adjusts the coefficient filter by applying the deepest gradient method. This method maximizes the correlation between the noise-contaminated ECG signal and environmental noise. The coefficients of the adaptive filter vary with noise which also changes over time. However, we expect a clean ECG signal in e(k) output. LMS algorithm has
many advantages over other algorithms such as fast processing since it does not require any squaring, averaging, or differentiating when it minimizes the error in the steepest gradient method [20]. Reading peak-to-peak signals generates a time series with
unevenly distributed output over time as shown in Figure 4. In [21] authors proposed a method to increase the accuracy of peak-to-peak reading, the ECG signal is squared which increases R amplitude higher than the other complexes and make it easier to detect R peaks. Due to the fact that heartbeat
doesn't follow a regular pattern, the reading is unevenly distributed over time. It is recommended to resample non-uniformity sampled signal [19]. In the resampling process, the
data set is re-estimated in equal intervals. Moreover, the resampling method is tied to the Monte Carlo technique in which simulation estimates new data with minimum error [5]

C. Feature Extraction

In [19] authors indicate that HRV frequency domain stores a lot of valuable drowsiness information. In order to extract the. R-R time series features in frequency domain, Short Fourier Transform technique was used to slide a window with a variable size and then FFT transformation technique was applied along the times series input. The result is a two dimensional (time- frequency) matrix with R-R time series frequency response. According to the author in [18] the low frequency to high frequency ratio decreases if an individual goes from an awake state to sleep state. Selecting features to achieve the highest machine learning method accuracy is accomplished by trying different features within the same data set. The selected features such as highest peak, standard deviation, and peak-to-RMS value are calculated in the LF and HF zones in the frequency domain. The number of features can be raised by adding other statistical features related to HRV, for example range and skewness of LF and HF in frequency domain have proved to be efficient additions.

In [21], the authors suggest that the features in the time domain; such as time variance, peak-to-RMS value, and minimum value; in 25% to 75% of a selected window time domain. However, adding more attributes from frequency domain could possibly lower the output accuracy, as shown in Figure 5. In this research, many different features in both time and frequency domain, were selected and tested. The final selection, based on the highest output accuracy,listed in Table 2.

III. ALGORITHM

Since drowsiness has different stages, algorithms relating to likelihood of drowsiness generate a lot of valuable information. We proposed using both the Naïve Bayes method and the logistic regression method in conjunction, because, in both methods, the output value is the probability

of drowsiness. However, the logistic regression technique was ultimately favored and chosen over the Naïve Bayes, which has the best result only if the selected features are
independent, and this is not the case with the features with
which we are working. Furthermore, logistic regression produces higher accuracy levels than the Naïve Bayes technique does [20].

A. Logistic Regression and Prediction of Probability

If we have a set of data in N dimensional space, we define a linear combination of these inputs with arbitrary weight such that

$$s=w\ ^{T}\ x$$

and

$$T(S)=\frac{e^{s}}{1+e^{s}}$$

where x is the features, w is the extracted weight, and T is the probability output. Linear output, s, is mapped to a different space which is limited between 0 and 1. The variable, S, is called the odds ratio, and it is the product of the logarithmic ratio of the probability of drowsiness and the probability of being awake. This parameter is a linear combination of inputs and is written as: $S=a+\sum b(i)*X$ where a(Intercept) and b(i) are generated by the algorithm, and X is the input matrix. In this case, learning the exact algorithm is achieved with minimal error with a probability function defined as

pሺy|xሻ൐ൣθሺywTxሻ,

where y is extreme drowsiness and is assigned a value of +1.Two deep sleep and awake states are being assigned the values +1 and 0. The likelihood of each state is defined by the probability function □ሺ|ሻ. In cases where there are multiple data sets, there are n sets, where

൛x1, y1ൟ....(xN,yN),

which are independent measurements. Therefore, the likelihood of the total measurement is the multiplication of each individual data set measurement defined as $\prod$ p(yn |xn). The coefficients and also non-linearity function in the logistic regression method [20]. Linear regression avoids overfitting errors with elimination of large coefficients in linear stage and mapping all outputs to an interval, the number of independent experiments increases the accuracy of the algorithm. Figure 6 summarizes the process of drowsiness detection from the start of recording the driver's ECG data, through the data

processing, and ending with the determination of the driver's state of drowsiness.

Algorithm 1: To detect HRV and for making the decision
between drowsy and non-drowsy state

Input: *Read ECG Signal (from two different sensors)*
Output: *The likelihood of drowsiness*
// read normalized ECG signal
1 ECG_signal = normalized (ECG)
// filtering the ECG signal
2 Filtered_ECG = adaptiveLMS (ECG_signal)
// defining the sampling rate
3 Fs = samplingRate
/ calculate time interval between R peak to peak */*
4 R_to_R = HRV (Fs, Filtered_ECG)
// resampling time series
5 RR = resamplingHRV (R_to_R)
// extracting frequency domain features
6 f-features = freqAnalysis (RR)
/ f-features:*
f1 = absolute magnitude square of Short Fourier Transform
f2, f3 = peak magnitude frequency response
f4, f5 = standard deviation
f6 = peak to RMS ratio
f7 = high magnitude frequency response
/ f-features*
// extracting time domain features
7 t-features = timeAnalysis (RR)
/ t-features:*
t1 = average signal in every 64 points
t2 = RMS signal of 64 points window
t3 = standard deviation in every 64 points
/ t-features*
//creating instances for logistic regression
7 Instances (:) = createInstance (f-features, t-features)
//creating data for logistic regression
8 TotalData(:) =[Instances (:),Label(:)]
//splitting data for training and testing
9 Training Data = 90% TotalData
10 Testing Data = 10% TotalData
// calculating intercept and model's coefficient//...
11 B(:)=logistic_regression(TrainingData(:))
// calculating odds for a new set of data //
*12 Logit (:)=B(0)+sum(B*Test Data)*
// Output: Probability of drowsiness //
13 Probability(:) =inverse(1+exp(-logit(:)))

B. Experiment

We developed a hardware system with two different setups, one with contact sensors and one with non-contact sensors. In order to detect the ECG signal, remove unwanted noise, and also gain the sensor ECG output, we tested two different micro-controllers, Beagle Bone Black and Arduino. We collected ECG signal data using each device for a five-hour period that included the subject's transition from being awake to being asleep. That was converted to discrete data. The Arduino's sampling frequency of 10 kHz was much lower than that of the Beagle Bone Black, 200 MHz; so, the data took up much less space and sped up the system performance.

The program was developed in Matlab 2015.

The ECG data were collected from three different individuals of different ages and genders, and the system was tested with two different methods, logistic regression and Naïve Bayes.

The result turns out to have higher accuracy in case of logistic regression. Since Naïve Bayes method relies on independent features and our features are dependent in frequency domain, therefore, the result confirms the lower accuracy of Naïve Bayes output. The accuracy of output for logistic regression test is over 92%, however, Naïve Bayes accuracy never exceeds 85% accuracy. Moreover, the minimum time of

drowsiness detection in our set-up was 12-24 seconds. For
every new person, the system collects few sets of ECG data
while the subject is asleep, and train the data to create a unique
algorithm for each person. In the testing mode, the system
detects between 12 and 24 seconds of ECG signal and
immediately publishes its prediction as the probability of
drowsiness, as illustrated in Figure 7. The experiments result
for three people shows a consistent accuracy over 90% in less
than 24 seconds. Our developed algorithm provides steady

results over time detecting drowsiness (approximately 20
seconds detection). The algorithm and feature extraction are
listed in Tables I and II.

IV. CONCLUSION

In this paper, we examined HRV to detect driver drowsiness.The accuracy was over 90% with minimum window of 20 seconds (ECG signal). Multiple tests were performed with data comprising of different age or gender. Study also
confirms the importance of low frequency (0.05 Hz – 0.1 Hz) and high frequency (0.16Hz-0.2Hz) areas. It also reveals that ultra-lower band ULF and VLF do not carry important information for drowsiness detection. Logistic regression provided 90% accuracy, however, accuracy can be improved if more training data regarding different psychological states of driver is collected. Also, extracting more independent features from frequency domain leads to higher accuracy and it even makes Naïve Bayes method more attractive than the logistic regression method.

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Fig. 6. Flow chart of drowsiness detection and details about algorithm 1 implementation.

TABLE I

TIME TO DETECT DROWSINESS USING MACHINE

LEARNING SYSTEM

Time Machine

Learning Subj. 1 Subj. 2 Subj. 3

Delay to
detect (s) Yes 28 24 30
Delay to
detect (s) No 145 138 132

TABLE II

COEFFICIENT OF LOGISTIC REGRESSION

Department of ECE AARUPADI VEEDU INSTITUTE OF TECHNOLOGY

ANALYSIS

Subject	Subject 1	Subject 2	Subject 3
Window_mean	1868	1734	1441
Window_std	619.4	589.2	673
Window_rms	-1496.5	-1567.2	-1460
Peak High Freq	112	132	150.5
Peak Low Freq	6.4	7.2	14.29
Std_HF	-80.1	-74.4	-82.6
Std_LF	-59.4	-68.2	-10.36
Peak2rmsHf	-4.5	-5	-7.16
Peak2rmsLF	-3.4	-3.2	-9.85
Intercept	-272.0	-293	-199.83

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TITLE
IBEACONS FOR LOCALIZATION AND TRACKING OF PEOPLE IN WOMEN SAFETY

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ABSTRACT:

In this work, architecture for real-time tracking using Bluetooth Low Energy (BLE) and iBeacons in women safety is proposed. The proposed system is to locate not only women but also other facilities such as children.It consists of four different frameworks: server communication, user interaction, cross-platform communication and outdoor localization. A wearable BLE Enabled device is setup with coms battery and a smart phone can be used in our system. The first stage of the tracking system is setting up and calibrating the BLE iBeacons for initialization. Then the Received Signal Strength is collected from the BLE Enabled devices carried by users. These data are analysed and calculated using our improved Least Square Estimation approach to estimate the actual RSSI of users.Once it's properly estimated the RSSI value by pairing with the developed android apk, the GPS location of the mobile is sharing to the server.by having the proper RSSI and GPS location in server, the results show that our tracking system achieves resolutions of the order of exact location of the device and ibeacon distance paired with the apk. This will be further integrated with Google map to improve the real-time tracking monitoring experiences.

IBEACONS FOR LOCALIZATION AND TRACKING OF PEOPLE IN WOMEN SAFETY

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I. INTRODUCTION

The successful launch of first Global Positioning System (GPS) satellite, the outdoor localization and navigation could be achieved with greater accuracy compared to indoor environment. Due to signal attenuation caused by various construction materials, the GPS system loses significant power in indoor environment. Further, obtaining the coverage of four satellites in indoor environment is a challenge . Hence, the concept of GPS based positioning was not extended for indoor localization systems. The advent of newer wireless standards such as

- Align virtual and real objects with each other.

IEEE 802.15.4, Bluetooth Low Energy (BLE), WiFi, and Radio-frequency identification (RFID) is aiding in developing new indoor positioning technologies. Recently introduced BLE-based device by Apple, iBeacon, en- ables accurate indoor positioning by providing periodic beacon signals. iBeacon technology has been recently applied by the researchers in to adjust the location of smart devices in an indoor environment. This technology is employed to im- prove indoor localization in the study presented in with the combination of wifi access point. The iBeacon deployment has not been considered while the iBeacon devices were placed, arbitrarily. The same approach has been employed in [6] for iBeacon-based indoor positioning with no efficient iBeacon deployment. The authors improved the location accuracy using Extended Kalman Filter.

In this article, the problem of iBeacon placement for indoor positioning is investigated. We focus on Received Signal Strength Indicator (RSSI) based indoor localization technique with RSSI-based iBeacon motes. The iBeacons install as the reference node to transmit their location information using BLE signals. BLE has broadcasting range of up to 70 m, which makes it an ideal technology for indoor localization. These messages are collected by smart phones, where they can be used for variety of applications such as location detection, push messages for marketing purposes, and prompts.

EXISTING SYSTEM

- The Existing system for using Bluetooth &WI-FI wireless technology it's use of only data transfer the point to point.
- The growing popularity using location-tracking system leads to a large amount of positioning technology
- This system high power consumption.
- It Consumes much more energy for practical use
- Due to the considerations of the above facts, it is necessary to invent a handheld device to the individual workers for safety.

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PROPOSED SYSTEM

- These system users encounter a landmark; this scheme can use the information of the landmark to calibrate the location of users.
- The iBeacon has the characteristics of easy to deployment, low power consumption and low cost.
- The positioning more accuracy of the system.
- According to the level of concentration workers takes the necessary safety measures before they entered into the manhole.

MODULE DESCRIPTION

- PIC16F877aIBEACON DEVICE
- POWER SUPPLY
- LCD Display
- MPLAB
- EMBEDDED C
- IBEACON APP

PIC16F877aIBEACON DEVICE

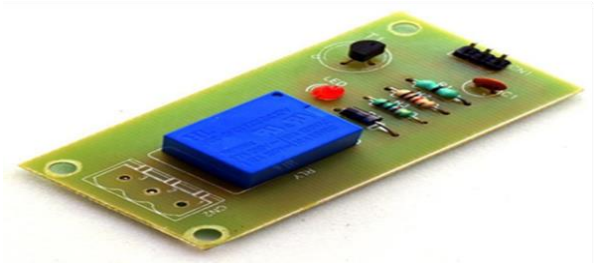
The microcontroller is a device that can perform a specific function according to the coding/program burnt into its program memory. The microcontrollers are special purpose devices used in many application like automobile, medical, instrumentation, battery management, smart phones accessories, motor and control drives, USB and wireless technology etc. One of the most reputed manufacturers of micro-controller is MICROCHIP. PCB design. They have the vast series of micro-controllers from 8bit, 16, 32 bit controllers both in SMD and through whole package. This board is build with PIC16F877A as a microcontroller unit. The input supply to the board can be fed from both ac and dc. It uses a crystal oscillator for generating frequency. A serial communication is achieved by an UART protocol. This board is specially designed for connecting digital and analog sensors which has input voltage range 5 or 12VDC as well as it can be interfaced with serial communication devices, relay boards etc.

SINGLE RELAY

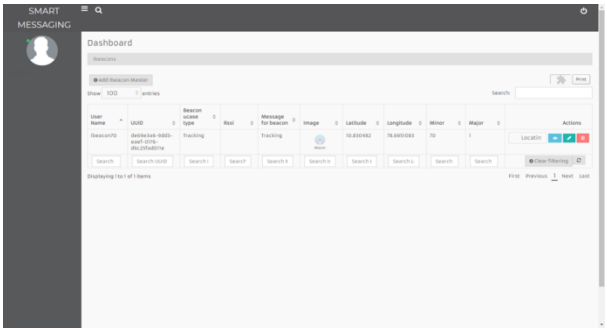
Relays are simple switches which are operated both electrically and mechanically. Relays consist of a n electromagnet and also a set of contacts. The switching mechanism is carried out with the help of the electromagnet. The main operation of a relay comes in places where only a low-power signal can be used to control a circuit.

It is also used in places where only one signal can be used to control a lot of circuits. They were used to switch the signal coming from one source to another destination. The high end applications of relays require high power to be driven by electric motors and so on. Such relays are called contactors.

A relay is an electromechanical switch which is activated by an electric current. A single relay board arrangement contains driver circuit, power supply circuit and isolation circuit. A relay is assembled with that circuit. The driver circuit contains transistors for switching operations. The transistor is use for switching the relay.An isolation circuit prevents reverse voltage from the relay which protects the controller and transistor from damage. The input pulse for switching the transistor is given from the microcontroller unit. It is used for switching of a single device.



Server Monitoring System



MONITORING SECTION

Mobile Track Android App

POWER SUPPLY

This maximizes the performance of each individual cell for longer runtime. It delivers its power at a lower weight than 4.0 Ah batteries, and it has a user-friendly shape. The Bosch 12V MAX system offers compatibility with the complete line of Bosch 12 V cordless power tools and chargers. Power/volume ratio yielding unrivaled energy density. Rugged impact resistant ABS case and cover (UL94-HB). Approved for transport by air. D.O.T., I.A.T.A., F.A.A. and C.A.B. certified. U.L. recognized under fi le number MH 20845.

Batteries can be charged manually with a power supply featuring user-adjustable voltage and current limiting. 12v 2.5Ah lead acid battery is a rechargeable battery that supplies electrical energy. These batteries are designed to release a high burst of current and then quickly recharged. Six cells are connected in series in this battery. The battery will perform in cold weather conditions down to -4°F. Absorbent Glass Mat (AGM) technology for superior performance. Valve regulated, spill proof construction allows safe operation in any position.

IBEACON SIGNAL RECORDING APP

One of the contributions of this research is developing a
customized application for android smart phones. This app can collect the propagated signals from the iBeacons, recorde them in a ".csv" file format and share the file by email, telegram and text message. Currently, the existing app developed for iBeacon such as Estimote, Beacon Scan, Indoor, and Dart is not efficient for localization while they are unable to record signals in the desired table format.

CONCLUSION

In Internet of Things (IoT) technologies, iBeacom motes, as a promising infrastructure of indoor localization, requires more research and evaluation. In this paper, impact of iBea- con placement for localization accuracy was considered. We experimentally evaluated the problem of RF-based positioning with iBeacon signal quality. Then, we introduced Crystal- based iBeacon Placement (CiP) for iBeacons employed in indoor positioning. The placement method has been ana- lyzed vertically and horizontally. It experimentally was tested and evaluated to validate its efficiency and yielded 21.16% improvement in terms of accuracy. Moreover, a customized android application was developed to collect and measure the signal from iBeacons, timely and efficiently. As future direction, we are planning to evaluate an Indoor Navigation System based on CiP idea and a machine learning method. Once it's properly estimated the RSSI value by pairing with the developed android apk, the GPS location of the mobile is sharing to the server.by having the proper RSSI and GPS location in server, the results show that our tracking system achieves resolutions of the order of exact location of the device and ibeacon distance paired with the apk. This will be further integrated with Google map to improve the real-time tracking monitoring experience..

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SOLAR VEHICLE for GREEN ENVIRONMENT

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Abstract— To overcome fossil fuels insufficient availability and make vehicles eco-friendly,Solar Power is utilized to run the Auto mobiles. By considering this, we have designed an ELECTRICAL VEHICLE which runs on SOLAR POWER. The vehicle is a three-wheeled drive that can be used as short distances shuttle. Since the Solar Based Vehicles will be the future of the automotive industry, it is necessary to design an Efficient & Economical Electric Vehicles.. This vehicle is an initiative in this direction.

Index Terms— Eco friendly, Electric Vehicle, Solar Power.

INTRODUCTION

As both the Energy demand and Environment concern

increase dramatically in the past decade, it necessary to

Find Solution to tackle such problems. The Solar Vehicles Harness the Solar energy which is converted into Electricity. Thus formed Electricity is utilized to run the Vehicle, which will be Free of pollutant. The Solar Vehicle, The vehicle powered by the Sun, leads to Clean & Green Environment.

The Photovoltaic Cells, made of Semiconductors like Silicon, are widely used to convert Electricity from the

Solar Power. The group of Photovoltaic cells forms the Solar Panel.

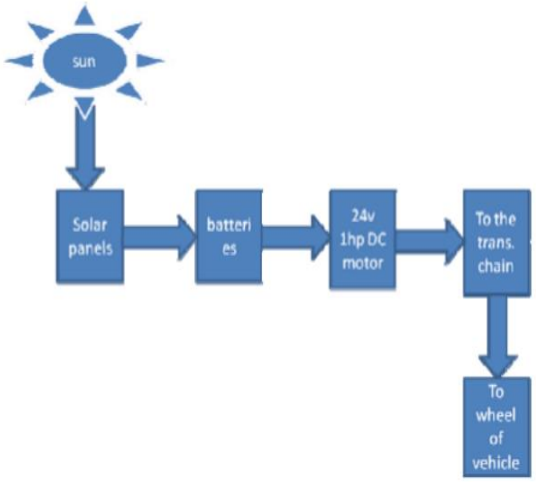


Fig 1.1

The fig 1.1 provides an overview of the process involved in the working of solar Power based Electric vehicle. For this Vehicles, the Solar insolation the Prime source of energy. The Solar Panels, the group of PV Cells with proper MPP Technique will generate the Electrical Energy.. The Electrical Energy obtained is used to Charge the batteries, which is used to run 24V DC Series Motor. The DC Series Motor is chosen as it has Very high Starting Torque. The shaft is used to Transmit the Power of the motor to the rear wheel of the vehicle.

The Proper Charging – Discharging Cycle of the Batteries are the most important concern. So the batteries are fully charged initially. And thereafter only, the Batteries are allowed to charge by the Solar panels output.

The Electric Vehicle is powered completely by the Solar Radiation. The Photovoltaic (PV) cells present in solar panels, convert the sun's energy into electric energy. Thus the Solar energy is used to power all the part of a vehicle for its propulsion.

Solar cars are powered by the sun's energy. The Major component of a solar Vehicle is its solar array, which collect the energy from the sun and converts it into usable electrical energy, The energy collected from the solar array is converted into the proper system voltage which will be fed to the Motor of the Drive. The Power Modulators such as converters adjusts the flow of energy to the motor, and then to the throttle. This Energy is used by the Motor to Drive the Wheel of the Vehicle.

COMPONENTS:

1. **SOLAR PANEL**
2. **BATTERY**
3. **DC MOTOR**
4. **WIRING SETUP**
5. **FRAME SUPPORT**
6. **CHAIN**

MANUFACTURING PROCESS:

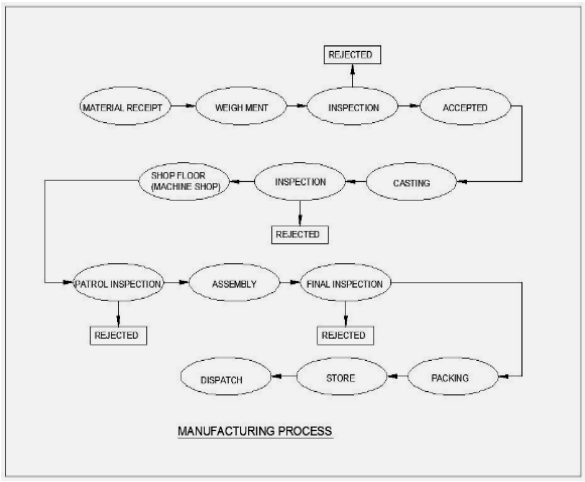


Fig 1.2

WORKING PROCESS:

PRINCIPLE OF WORKING OF DC MOTOR:

The DC MOTOR works on the principle laid in the FLEMMING'S left hand rule

SOLAR PANEL:

The Solar panels are used generate electricity by converting the sun's rays into energy. The car runs by using the energy that is stored in the batteries.

WIRING SETUP:

Electrical connections are made in series or in parallel to achieve a desired output voltage and/or desired current capability. The cells must be connected electrically to one another and to the rest of the system.

D.C. MOTOR (PERMANENT MAGNET):

An electric motor is a DC machine that converts electrical energy to mechanical energy. This conversion is based on the principle that whenever the current-carrying conductor is placed in a magnetic field, it experiences a magnetic force whose direction is given by Fleming's left-hand rule.

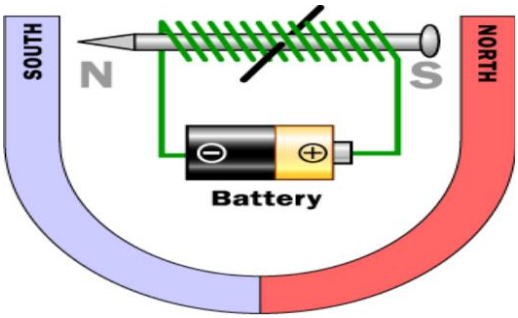


Fig 1.3

FRAME SUPPORT:

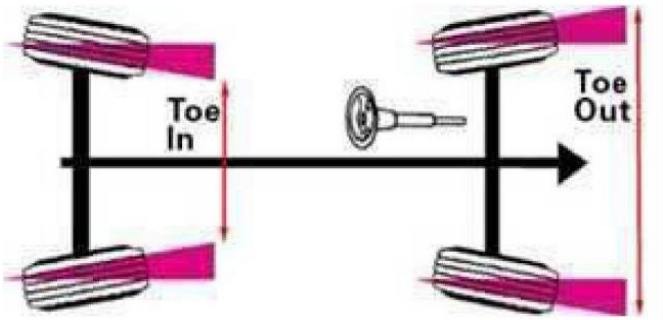
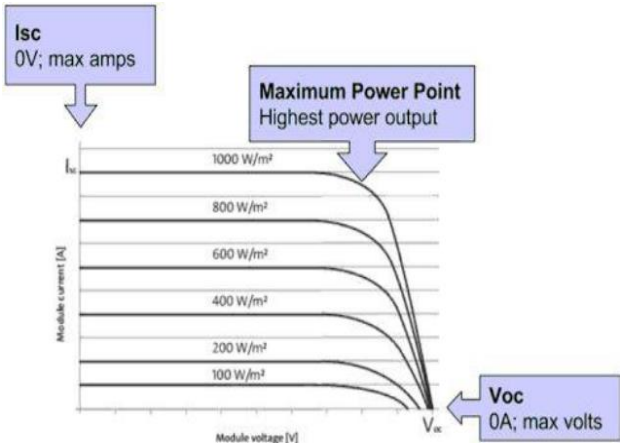


Fig 1.4

ANALYSIS:

Month	Electricity generated, supplied and excess electricity by the PV (kW)					Energy supplied to the inverter by the battery (kW)				Energy received by the inverter and supplied to the AC load (kW)			AC load (kW)
	Electricity generated	Charge the battery	Supplied to the inverter	Excess electricity generated	Losses	Battery alone	Battery with PV	Total supplied	Losses	Energy in	Energy out	Losses	
January	77.109	26.868	11.375	38.523	0.343	16.926	5.551	22.477	4.391	33.852	28.892	4.960	28.892
February	69.072	23.902	10.871	33.776	0.523	15.288	4.417	19.705	4.197	30.576	26.096	4.480	26.096
March	72.443	28.656	10.726	32.594	0.467	16.926	6.200	23.126	5.530	33.852	28.892	4.960	28.892
April	64.596	27.337	10.165	26.644	0.430	16.380	6.195	22.575	4.762	32.760	27.960	4.800	27.960
May	61.851	29.563	10.009	21.846	0.433	16.926	6.917	23.843	5.720	33.852	28.892	4.960	28.892
June	54.679	29.159	8.971	16.036	0.513	16.380	7.409	23.789	5.370	32.760	27.960	4.800	27.960
July	51.747	30.491	8.478	12.214	0.564	16.926	8.448	25.374	5.117	33.852	28.892	4.960	28.892
August	49.461	31.007	8.464	9.4810	0.509	16.926	8.462	25.388	5.619	33.852	28.892	4.960	28.892
September	52.154	30.789	8.047	12.956	0.362	16.380	8.333	24.713	6.076	32.760	27.960	4.800	27.960
October	59.964	30.055	8.890	20.615	0.404	16.926	8.036	24.962	5.093	33.852	28.892	4.960	28.892
November	66.798	30.044	9.457	26.581	0.716	16.380	6.923	23.303	6.741	32.760	27.960	4.800	27.960
December	74.212	29.061	10.936	34.161	0.054	16.926	5.990	22.916	6.145	33.852	28.892	4.960	28.892
Total	754.086	346.932	116.409	285.427	5.318	199.290	82.881	282.171	64.761	398.580	340.180	58.400	340.180

Motor voltage VS Motor current :



CONCLUSION

This project work has provided us an excellent opportunity and experience, to use our limited knowledge. We feel that the project work is a good solution to bridge the gates between institution and industries.

The "**FABRICATION OF MINI SOLAR VEHICLE**" is working with satisfactory conditions. As for this trailer is concerned in India, single piston arrangement is commonly used. Instead, with the same Piston arrangement available, repositioning the system with the help of the spur gears meshed normal to each other; the trailer can be lifted in the other two sides just by changing the position with the help of a motor connected with the battery.

Thus, we have developed a "**FABRICATION OF MINI SOLAR VEHICLE**" which helps to know how to achieve low cost automation. The operating procedure of this system is very simple. By using innovative techniques, this system can be modified and developed based on the human need in our day to day life.

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TITLE
AN AUTOMATED METHOD FOR COUNTING OF BLOOD CELLS USING IMAGE PROCESSING

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ABSTRACT:
The project proposes an automated method for counting of blood cells using image processing techniques. The traditional methods of blood analysis involve the manual counting of blood cells observed under the microscope. This method poses large dependency on the skills of the laboratory technician and can cause errors. The automated hematology analyzers, on the other hand, produce accurate results. However, this equipment is very costly and difficult to move once installed. They require trained experts to operate this equipment. The proposes method provides a low cost and portable solution for obtaining the blood cell count using an image processing algorithm that works on the images captured by a microscope with considerable accuracy. The method minimizes the cost of the equipment while promoting mobility of the device for relocation to remote parts for pathological tests.

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1. INTRODUCTION

Pathology is the field of investigation of samples collected from the individual to provide proof for diagnosis in the medical field. It involves the detection of pathogens or harmful foreign particles present in the sample for providing important proof for further treatment of the diseases. A pathologist collects the samples and processes it using the laboratory equipment to generate a report based upon the results of the test. Frequently performed tests such as blood test, test for blood sugar, etc. also undergo the same process. The equipment currently available with the pathologist is the hemocytometer or the hematology analyzers. This equipment is bulky and highly expensive. Even though they provide reasonable accuracy, the cost of the equipment is so high that many pathologists come together to purchase a single analyzer machine.

The problem statement of the project is to define a system which answers the hurdles present in the field of pathology. The system especially focuses on the rural parts and the remote village areas were the situation is much more acute than in the urban areas. The system should manage the cost of the currently available systems which is refraining the pathologists from approaching these areas and improve the services. Medical laboratories provide confirmation of clinical diagnoses, facilitate improved management of diseases, generate essential public health information and with adequate government funding.

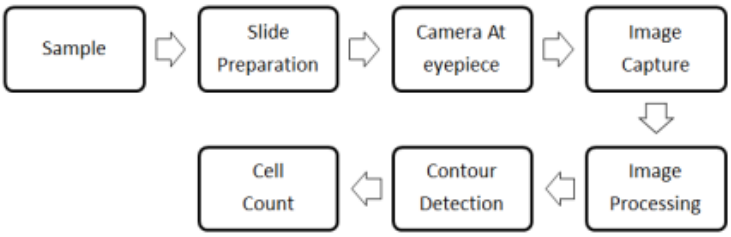
This task requires a lot of time and skilled operators. Fast and cost-effective production of blood cell count is very important to make better and affordable diagnosis. It is a critical task to extract morphological information about blood cells of an individual. One of the most challenging tasks is to extend traditional approaches to segmentation and object classification. When compared with the manual process, though the automated analyzers give fast and reliable results regarding the number, average size, and variation in size of blood cells, they cannot reliably count the abnormal cells, overlapped cells and do not detect cell shapes.

In this regard, the report presents an automated method, which counts the RBCs present in a blood sample. An image involves some unwanted particles (noise). Therefore, some pre-processing is needed which is called image preparation phase. The image preparation is done as follows: The first step is to convert the image from RGB color space to gray scale image then, this gray scale image is converted into binary image by applying thresholding method. Then, all the non-peripheral holes are filled in this binary image followed by smoothing. The next step is to fill the peripheral holes and finally, a hole less image is produced. From this hole less image, each cell is

extracted and categorized. After the image is prepared properly after filtering and image processing techniques, finally, the total number of cells in the image is counted.

2. LITERATURE SURVEY

The project aims at providing a portable and low cost solution for pathology processes especially for blood tests for counting the erythrocytes present in the specified volume of blood. Literature related to the proposed work shows proof for supporting the problem statement with appropriate statistical data. Results of blood analysis not only have an important clinical significance to the observation of the diagnosis of the disease and the observation of curative effect, but also give a reference for human health assessment. Blood analysis in rural areas poses a major hurdle in the field of medicine and point of care treatment. A paradigm shift from the current 'biomedical model' to a 'sociocultural model' is required, to meet the needs of the rural population.



3. PROPOSED METHODLOGY

The system is designed to obtain images from the blood samples. Smear of the blood samples are prepared and kept under the objective lens of a microscope. The microscope is fitted with a camera that can take suitable images and load them into the processing unit. The processing unit possesses the image processing software which processes the images to extract information about the count of the red blood cells present in the samples.

The scheme for the proposed system involves various image processing techniques such as image acquisition through the camera mounted microscope. The lens of the microscope needs to be selected for specific power and magnification.

Fig. 1: Block diagram of the proposed method

The red blood cells are considerably visible under a microscope having a resultant magnification of 400x. The camera resolution is also an important parameter for determining the number of red blood cells present in the sample. The resolution of the image, the magnification of the lens and the power of the lens are the crucial parameters for obtaining high accuracy with the proposed scheme.

After acquiring the image, it needs to be pre-processed before the information is extracted. Techniques such as low pass filtering, median filtering need to apply for reducing the redundancy and noise, if present, from the image. These techniques provide an image suitable for the further processing.

The Python IDLE and the open source Open CV library is used for image processing. It is an open source platform that provides numerous functions for image processing. These functions can be modified depending on various parameters that the function uses for processing.

In our application, automatic area classification is a preprocessing step before further accurate and detailed cell enumeration and analysis.

4. WORKING

After preparing the blood smear of the blood samples on the slide the image is processed. The processing is done using the OpenCV library in the Python IDLE interface. Based on the algorithm the image is processed using various image processing techniques. The magnification of the microscope ensures that the RBCs are visible and image processing is possible on it. To ensure that proper counting of RBCs is done the image is first converted from RGB to Grey scale.

But the image obtained after Grey scaling is not so sharp and hence, it is further subjected to High pass filtering where sharp images of RBCs are obtained. Now in order to count the RBCs, various edge detection techniques can be used. Canny Edge detection technique is used here which help in generation of contours which denote the shape of the cells and are counted based on the algorithm.

In image processing step the image is being enhanced in term of quality level to be prepared for the next process. It is because the produced image may have some artefacts and illumination issues.

Feature extraction is followed by morphological operations, feature extraction also called description deals with extraction features that result in some quantitative information of interest of features that are basic for differentiating one class of objects from another .The counting of RBCs in the area covered by field of view of camera is done by image processing algorithm. But the unit of actual count of the blood cells which appears on the report is millions /cm3. Therefore to obtain the now such samples are usually diluted with an anticoagulant liquid to separate the cells to decrease overlapping. In such cases we have to multiply the count by the dilution factor.

4. RESULTS

The results of the processed samples were verified with the count from the original sample. The original sample processed through hematology analyzer showed a reading of 5.38 million cells per cm3 and the sample processed using the microscope assembly with image processing algorithm showed a count of 5.19 million per cm3. This shows that the proposed system has an error of 3.54% and an accuracy of 96% which is considerable taking into account the normal range of the RBC and the cost effectiveness of the proposed system.

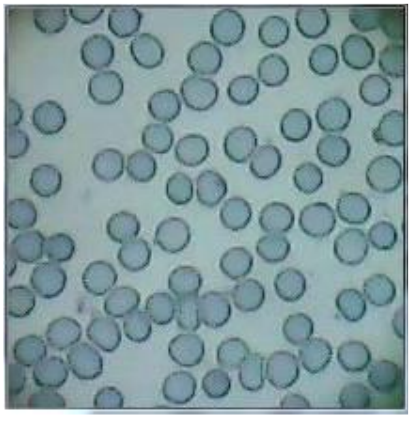


Fig 2.Original Image of the cells

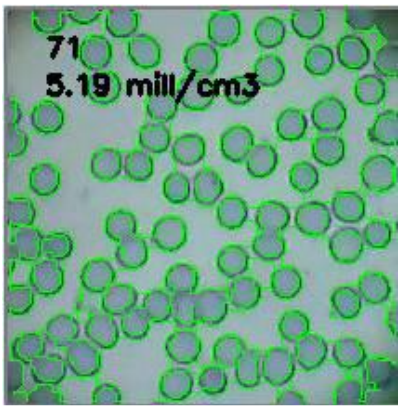


Fig 3. Image showing marked cells with count.

The count of the cells obtained from the image is averaged and interpolated to obtain the final count of the RBCs present in 1 cubic centimeter volume of blood. Different Algorithms for detecting the blood cells from the image were tested. The algorithm which suited the most was utilized for increasing the efficiency of the system.

A comparative study with lenses from different sources was tested to study whether the observed images were suitable for the algorithm to find the cells efficiently. Correspondingly, the pair of objective and eyepiece which produced magnified and clear image was selected and used for the system to work accurately.

5. CONCLUSION

As a conclusion, this research successfully uses various image processing techniques for Red Blood Cell Estimation. It utilizes morphological approaches for segmentation, extraction and estimation in order to solve problem in image processing of the red blood cells. It proposes an image processing system that uses Python Idle software for blood cell counting. By using the Python Idle, all the importance aspects of a correct algorithm have been successfully produced.

Different algorithms were employed for the detection and counting. With the efficient algorithm, the red blood cells can be detected and segmented as well as estimate the number of the red blood cells. It enables the study of the morphological features of RBC by the pathologist can determine whether the person is normal referring the amount of RBC in human blood. There is a need for fast and cost-effective production of blood cell count reports. This system includes an effective and efficient method in recognizing and counting blood cells as a practical alternative to the manual blood cell counting. Since it's an on-going study, more enhancements and improvement could be done in the further process. The system can be further improvised for detecting various diseases related to different blood cell morphologies.

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TITLE
A SMART BAND FOR WOMEN SAFETY USING RASPBERRY PI

AUTHORS
Kankanala sitaram,Pavan chowdary,Akhil reddy,Guide-Vijendra babu (B.E.M.TECH.,Ph.D).

ABSTRACT:

As we see in now days safety for women is very less in our society.They are not able to go out without proper security.This security issues makes parents insecure so that parents are afraid of send their daughters out.As the survey conducted by government of India 83 percent of crimes are increased against women between 2011 to 2020.As we can't change the society but we can make a try to increase the security of women using technology.We know that there are many smartphone applications based on women panic situation but it is not possible to the victim to reach the cellphone all the time. In this approach, the focuses on a security system that is designed merely to serve the purpose of providing security to women so that they never feel helpless while facing such social challenges. An advanced system can be built that can capture the video of the event as well assend the emergency messages of the victim through GSM to respective mobile numbers. The idea to develop a smart system for women is completely comfortable and also easy to use as compared to existing women security solutions such as infamous mobile apps, bulky belts and a separate garment that are just very abstract and obsolete.

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Key Words: Pulse Sensor, GPS, GSM,Panic button, Raspberry pi,Camera.

1. INTRODUCTION

Women safety in India is a big problem, Safety of women matters a lot whether at home, outside the home or working place. It is very true that women in India are given a place of Goddess Lakshmi in the Indian society however we also cannot ignore the negative aspect of women position in India. Areas like streets, public spaces, public transport, etc have been the territory of women hunters. Safety of women in India is a vast topic now-a-days. We cannot say that women are safe in India by seeing the last few year crimes against women especially in the national capital. Women generally are afraid to go alone outside. It is a very sad reality of the country that its women citizens are living with fear all time. Personal safety of women has been the topic of importance for every Indian citizen.

Despite of formation of various effective rules and regulations by the Indian government to handle and control the crimes against women, the number of crimes against women are increasing day by day. The status of women in the country has been more offensive and dreadful in the last few years. It has decreased the confidence level of women for safety in their own country. We should not blame the government because women safety is not only the responsibility of government only, it is the responsibility of every Indian citizen.

Women in India known as the better half of Indian society, today, are becoming the most vulnerable section as far as their safety and security is concerned. This surely indicate that there has been an increasing rage of such sexual overdrives in present generation. Rape is the fourth most common crime against Women in India. According to latest National Crime Records Bureau (NCRB) 2013 annual report, 33,707 rape cases are reported across only India. The number of reported rape cases has been steadily increasing over the past decade. A step towards curbing incidents of this heinous crime is to develop a device that can sense the impending danger automatically and help in rescuing the victims from such act. Research shows that such devices exist commercially but requires manual pressing of button to trigger alarm. Since the mental state of women as well is children is affected during such act consequently manual pressing of button is not ideal.

The citizens of India, have to take up some fundamental duties to contribute towards bringing an order to ensure dignity and respect for women so that she can also enjoy her human rights and fundamental rights with sense of pride, freedom and confidence. To ensure this, the society must work together to give an edge to the solution. For example, women in the society must be provided with devices with latest technology which provides her location using GPS technology to a central control room of police or send messages of her address to nearby locations.

Public outrage after the brutal rape and murder of the 23 year old student, "Nirbhaya" in Delhi on 16 December 2012 has focused greater attention on necessity for holistic measures for security and safety of women. Sadly despite a strong legislation there has been no reduction in incidents of assault and physical abuse of women underlining larger socio-political ills and environmental changes in Indian society today. The underlying trends may seem aberrations in male behavior but these have become so pronounced in recent times and their ill effects so damaging to society at large that these need blunt assertion. It has always been a concern for many people and communities around the world. It becomes evident when we look at variousbut happenings taking place around the world, where the identity of woman has been misunderstood by a few

individuals in the society and an attempt to harm a woman's social status has been made and while it may be decades or

centuries before the world becomes a safer place for us, there are several things we can—and must—do to protect ourselves.

2. LITERATURE SURVEY

Projects like VithUapp, Nirbhaya, Spot N Save Feel Secure app were introduced lately. But the most of them had many

disadvantages over advantages. Firstly the concept was done by the app VithU mobile app. In this app when the user faces any challenges, Alert messages are sent to the listed contacts, which can be saved prior itself. The message is sent along with their physical location to the already saved contact. But the disadvantage of this app is that we have to click the power button for 2 times consecutively, which is not possible at all the situation.

Nirbhaya, a Pune based software company has launched in 2012 named after Delhi gang Rape. It can send a distress message to a specified contact group in an emergency situation confronting a woman. They will send an alarm by way of an SMS denoting woman's location to the configured group through GPS. It also gets updated on every 300 meters of move. The users can configure their own list of contacts incorporating police and other close relatives and friends. The major drawback of this app also is that it is physically dependent ,that is not possible in all situations.

Spot N Save Feel Secure app is a special portable smart band which works along with this app. The working of this app is by clicking on the button on the band twice to send out signal to the guardian network. Signal will be updated every 2 minutes. This app is not applicable in all situations since for an unnoticed situation or unpredictable time, users can't make alert previously by clicking it twice.

365 Security Guard provides the user with 120db personal alarm with high intensity LED flash light, Safety hammer, Belt cutter and a portable charger. But since it is not so portable they cannot be carried everywhere. It doesn't give any assurance that this device can be carried for all the places the girls move.

In this [4] proposed system with the push of one button, people can alert selected contacts that the person is in danger and share the location. With this personal safety app, you'll never walk alone. The personal safety application needs the name and number of the person who is to be contacted in times of emergency. Users can add multiple people's mobile numbers in the emergency contacts list. These are the people who will receive notifications in case of an emergency. All it needs is the user's action to trigger an SOS button provided and it shoots messages as fast as the device can manage. This app also provides necessary first-aid measures that should be this [5]literature focus is on creating a safety system that brings about a solution that ensures both defence and creation of a seamless pathway to initiating legal procedures, if any; have to be taken by the victim. We expect to create a partial wearable that can provide a complete security solution and become a utility that softens the restlessness among women and their family members. The objective of this literary work is to create a safety system in the form of a portable safety device for women that do the following tasks: 1. Alerts family and police and gives location coordinates of the woman being attacked. 2. Incorporates a defensive mechanism by giving a mild shock.

3. PROPOSED SYSTEM

It is proposed to women safety using Raspberry Pi. As shown in figure 1 below, the device intends to work in two sections. In the first section, if a woman is subjected to attack by an adversary, then a switch has to be pressed manually, by her (which will be ideally located at a convenient location on the body). This switch will trigger the controller (raspberry pi) to capture the image/video of the attacker and transmit it through duplicity. Attempts are being made to develop a method by which this image can be transferred on a web server. In Second section, emergency message "Please Help" will send to the predecided cell phone numbers (typically the family and the friends) via GSM module.

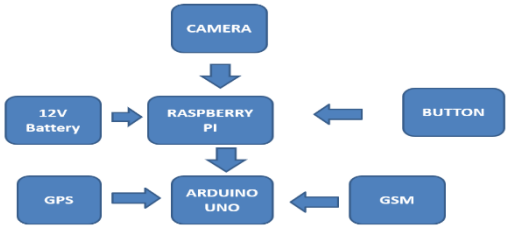

Fig. 1: Block diagram of women safety system

3.1 HARDWARE

- Pulse sensor
- GSM,GPS
- Powersupply
- Panic button
- Camera
- Raspberry pie

3.1.1 PULSE SENSOR

The Pulse Sensor is a pulse rate detecting device Normal heart rate of a human is from 70 to 90.This sensor senses the pulse rate by clipping it in the finger tip. This has two side, one is front side which is a heart shaped. This is the side that makes contact with the skin. On the front a small round hole is present, and here it is where led shines its light. Under the LED light a small little square is present That is ambient light sensor like used in laptops and mobile phones .This is mainly used to adjust the automatic brightness according to the situation. The LED shines light and sensor reads the light that bounces back. Still there are so many

parts at the back side of the sensor. At the back side all other parts got mounted.

Fig -1: **PULSE SENSOR**

3.1.2 GSM

The SIM800L module supports quad-band GSM/GPRS network, available for GPRS and SMS message data remote transmission. The SIM800L communicates with the microcontroller via UART port, supports SIMCOM enhanced AT Commands. It also has a built-in level translation, so it can work with the microcontroller of higher voltage more than 2.8V default. Apart from, the board also supports A-GPS technique which is called mobile positioning and gets the position by the mobile network. This feature makes it a tracker module.

3.1.3.POWER SUPPLY

This is a 5v Micro USB power connector into which you can plug your compatible device.

3.1.4 PANIC BUTTON

A panic alarm is an electronic device designed to assist in alerting somebody in emergency situations where a threat to persons or property exists. This device gets activated when an individual call for help.

3.1.5. Camera

The 5MP Raspberry Pi 3 Model B Camera Module Rev 1.3 with Cable equips flexible cable for attaching with Raspberry Pi 3 Model B. The high-definition 5MP camera delivers outstanding photos but can also shoot video. The lightweight camera module allows it to be used in more practical roles, such as a hidden camera. This Raspberry Pi Camera Module is a custom designed add-on for Raspberry Pi.

3.1.6.RASPBERRY PI

The Raspberry Pi Camera v2 is a high quality 8 megapixel Sony IMX219 image sensor custom designed add-on board for Raspberry Pi, featuring a fixed focus lens. It's capable of 3280 x 2464 pixel static images, and also supports 1080p30, 720p60 and 640x480p60/90 video

RESULT

Fig-2: HARDWARE IMPLEMENTATION

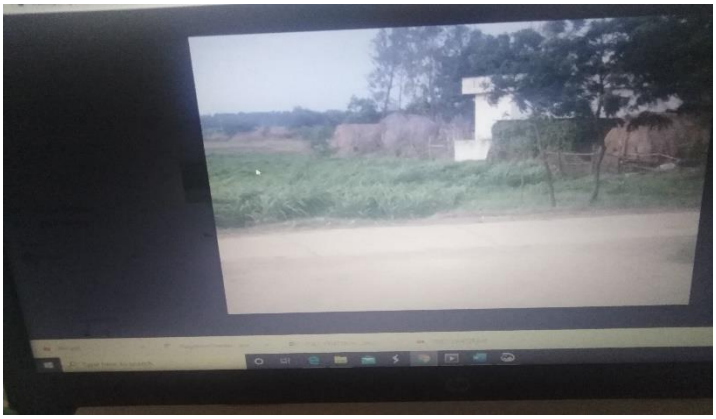

Fig-3: VIDEO SEND TO REGISTERED MAIL

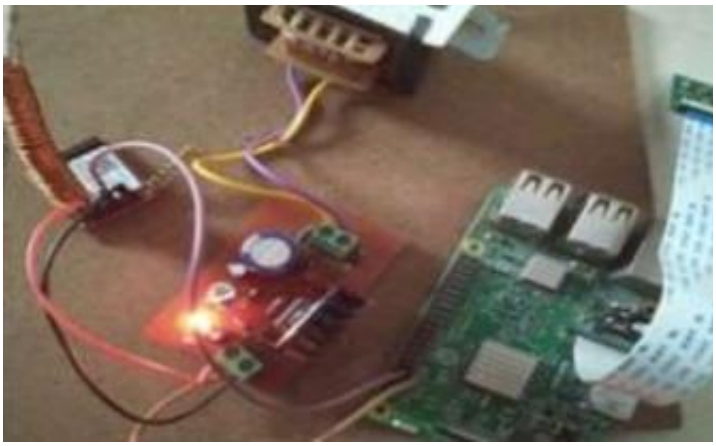

Fig-4:HARDWARE IMPLEMENTATION SMS READING

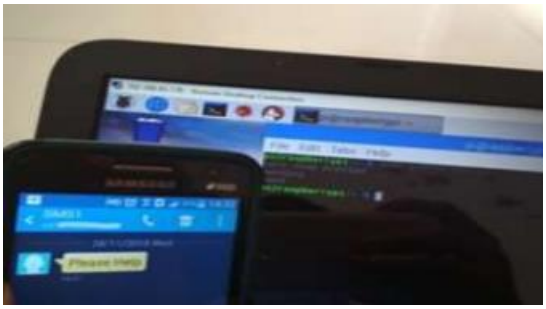

Fig-5:SMS IMPLEMENTATION

4. CONCLUSION

This type of idea plays an important role towards providing the fastest way of safety for women. The proposed design will deal with critical issues faced by women in the recent past and will help to solve them through using safety devices. This work was focused on developing a smart low-cost device to help women, feel them safer and prevent the occurrence of rape, harassment and other dangerous situations. The project would aid in enhancing the safety and security of all despondent and badgered women and children. It can be concluded that the system helps to support gender equality by providing a safe environment to women in the society, and allows them to work till late nights. Anyone before doing any crime against the women will be deterred and it helps to reduce the crime rate against the women.

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TITLE
IBEACONS FOR LOCALIZATION AND TRACKING OF PEOPLE IN WOMEN SAFETY

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ABSTRACT:

In this work, architecture for real-time tracking using Bluetooth Low Energy (BLE) and iBeacons in women safety is proposed. The proposed system is to locate not only women but also other facilities such as children.It consists of four different frameworks: server communication, user interaction, cross-platform communication and outdoor localization. A wearable BLE Enabled device is setup with coms battery and a smart phone can be used in our system. The first stage of the tracking system is setting up and calibrating the BLE iBeacons for initialization. Then the Received Signal Strength is collected from the BLE Enabled devices carried by users. These data are analysed and calculated using our improved Least Square Estimation approach to estimate the actual RSSI of users.Once it's properly estimated the RSSI value by pairing with the developed android apk, the GPS location of the mobile is sharing to the server.by having the proper RSSI and GPS location in server, the results show that our tracking system achieves resolutions of the order of exact location of the device and ibeacon distance paired with the apk. This will be further integrated with Google map to improve the real-time tracking monitoring experiences.

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IBEACONS FOR LOCALIZATION AND TRACKING OF PEOPLE IN WOMEN SAFETY

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II. INTRODUCTION

The successful launch of first Global Positioning System (GPS) satellite, the outdoor localization and navigation could be achieved with greater accuracy compared to indoor environment. Due to signal attenuation caused by various construction materials, the GPS system loses significant power in indoor environment. Further, obtaining the coverage of four satellites in indoor environment is a challenge . Hence, the concept of GPS based positioning was not extended for indoor localization systems. The advent of newer wireless standards such as IEEE 802.15.4, Bluetooth Low Energy (BLE), WiFi, and Radio-frequency identification (RFID) is aiding in developing new indoor positioning technologies. Recently introduced BLE-based device by Apple, iBeacon, en- ables accurate indoor positioning by providing periodic beacon signals. iBeacon technology has been recently applied by the researchers in to adjust the location of smart devices in an indoor environment. This technology

- Align virtual and real objects with each other.

is employed to im- prove indoor localization in the study presented in with the combination of wifi access point. The iBeacon deployment has not been considered while the iBeacon devices were placed, arbitrarily. The same approach has been employed in [6] for iBeacon-based indoor positioning with no efficient iBeacon deployment. The authors improved the location accuracy using Extended Kalman Filter.

In this article, the problem of iBeacon placement for indoor positioning is investigated. We focus on Received Signal Strength Indicator (RSSI) based indoor localization technique with RSSI-based iBeacon motes. The iBeacons install as the reference node to transmit their location information using BLE signals. BLE has broadcasting range of up to 70 m, which makes it an ideal technology for indoor localization. These messages are collected by smart phones, where they can be used for variety of applications such as location detection, push messages for marketing purposes, and prompts.

EXISTING SYSTEM

- The Existing system for using Bluetooth &WI-FI wireless technology it's use of only data transfer the point to point.
- The growing popularity using location-tracking system leads to a large amount of positioning technology
- This system high power consumption.
- It Consumes much more energy for practical use
- Due to the considerations of the above facts, it is necessary to invent a handheld device to the individual workers for safety.

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PROPOSED SYSTEM

- These system users encounter a landmark; this scheme can use the information of the landmark to calibrate the location of users.
- The iBeacon has the characteristics of easy to deployment, low power consumption and low cost.
- The positioning more accuracy of the system.
- According to the level of concentration workers takes the necessary safety measures before they entered into the manhole.

MODULE DESCRIPTION

- PIC16F877aIBEACON DEVICE
- POWER SUPPLY
- LCD Display
- MPLAB
- EMBEDDED C
- IBEACON APP

PIC16F877aIBEACON DEVICE

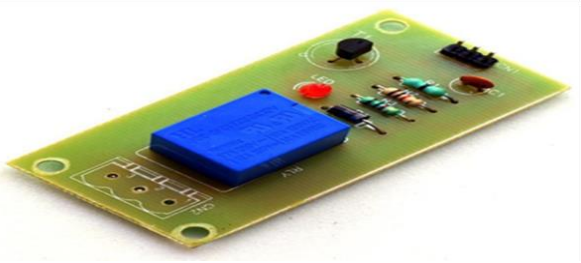
The microcontroller is a device that can perform a specific function according to the coding/program burnt into its program memory. The microcontrollers are special purpose devices used in many application like automobile, medical, instrumentation, battery management, smart phones accessories, motor and control drives, USB and wireless technology etc. One of the most reputed manufacturers of micro-controller is MICROCHIP. PCB design. They have the vast series of micro-controllers from 8bit, 16, 32 bit controllers both in SMD and through whole package. This board is build with PIC16F877A as a microcontroller unit. The input supply to the board can be fed from both ac and dc. It uses a crystal oscillator for generating frequency. A serial communication is achieved by an UART protocol. This board is specially designed for connecting digital and analog sensors which has input voltage range 5 or 12VDC as well as it can be interfaced with serial communication devices, relay boards etc.

SINGLE RELAY

Relays are simple switches which are operated both electrically and mechanically. Relays consist of a n electromagnet and also a set of contacts. The switching mechanism is carried out with the help of the electromagnet. The main operation of a relay comes in places where only a low-power signal can be used to control a circuit.

It is also used in places where only one signal can be used to control a lot of circuits. They were used to switch the signal coming from one source to another destination. The high end applications of relays require high power to be driven by electric motors and so on. Such relays are called contactors.

A relay is an electromechanical switch which is activated by an electric current. A single relay board arrangement contains driver circuit, power supply circuit and isolation circuit. A relay is assembled with that circuit. The driver circuit contains transistors for switching operations. The transistor is use for switching the relay.An isolation circuit prevents reverse voltage from the relay which protects the controller and transistor from damage. The input pulse for switching the transistor is given from the microcontroller unit. It is used for switching of a single device.

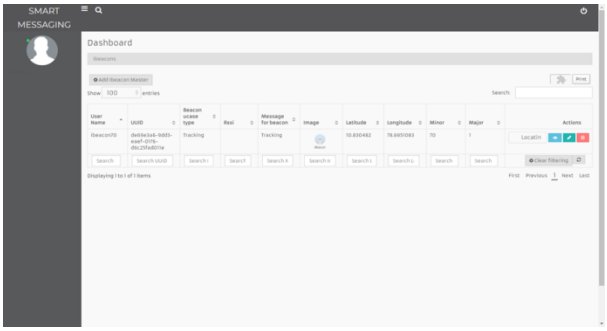


MONITORING SECTION

Mobile Track Android App

 ISBN: 978-93-5406-440-1

Server Monitoring System



POWER SUPPLY

This maximizes the performance of each individual cell for longer runtime. It delivers its power at a lower weight than 4.0 Ah batteries, and it has a user-friendly shape. The Bosch 12V MAX system offers compatibility with the complete line of Bosch 12 V cordless power tools and chargers. Power/volume ratio yielding unrivaled energy density. Rugged impact resistant ABS case and cover (UL94-HB). Approved for transport by air. D.O.T., I.A.T.A., F.A.A. and C.A.B. certified. U.L. recognized under fi le number MH 20845.

Batteries can be charged manually with a power supply featuring user-adjustable voltage and current limiting. 12v 2.5Ah lead acid battery is a rechargeable battery that supplies electrical energy. These batteries are designed to release a high burst of current and then quickly recharged. Six cells are connected in series in this battery. The battery will perform in cold weather conditions down to -4°F. Absorbent Glass Mat (AGM) technology for superior performance. Valve regulated, spill proof construction allows safe operation in any position.

IBEACON SIGNAL RECORDING APP

One of the contributions of this research is developing a
customized application for android smart phones. This app can collect the propagated signals from the iBeacons, recorde them in a ".csv" file format and share the file by email, telegram and text message. Currently, the existing app developed for iBeacon such as Estimote, Beacon Scan, Indoor, and Dart is not efficient for localization while they are unable to record signals in the desired table format.

CONCLUSION

In Internet of Things (IoT) technologies, iBeacom motes, as a promising infrastructure of indoor localization, requires more research and evaluation. In this paper, impact of iBea- con placement for localization accuracy was considered. We experimentally evaluated the problem of RF-based positioning with iBeacon signal quality. Then, we introduced Crystal- based iBeacon Placement (CiP) for iBeacons employed in indoor positioning. The placement method has been ana- lyzed vertically and horizontally. It experimentally was tested and evaluated to validate its efficiency and yielded 21.16% improvement in terms of accuracy. Moreover, a customized android application was developed to collect and measure the signal from iBeacons, timely and efficiently. As future direction, we are planning to evaluate an Indoor Navigation System based on CiP idea and a machine learning method. Once it's properly estimated the RSSI value by pairing with the developed android apk, the GPS location of the mobile is sharing to the server.by having the proper RSSI and GPS location in server, the results show that our tracking system achieves resolutions of the order of exact location of the device and ibeacon distance paired with the apk. This will be further integrated with Google map to improve the real-time tracking monitoring experience..

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SOLAR VEHICLE for GREEN ENVIRONMENT

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Abstract— To overcome fossil fuels insufficient availability and make vehicles eco-friendly,Solar Power is utilized to run the Auto mobiles. By considering this, we have designed an ELECTRICAL VEHICLE which runs on SOLAR POWER. The vehicle is a three-wheeled drive that can be used as short distances shuttle. Since the Solar Based Vehicles will be the future of the automotive industry, it is necessary to design an Efficient & Economical Electric Vehicles.. This vehicle is an initiative in this direction.

Index Terms— Eco friendly, Electric Vehicle, Solar Power.

INTRODUCTION

As both the Energy demand and Environment concern

increase dramatically in the past decade, it necessary to

Find Solution to tackle such problems. The Solar Vehicles Harness the Solar energy which is converted into Electricity. Thus formed Electricity is utilized to run the Vehicle, which will be Free of pollutant. The Solar Vehicle, The vehicle powered by the Sun, leads to Clean & Green Environment.

The Photovoltaic Cells, made of Semiconductors like Silicon, are widely used to convert Electricity from the

Solar Power. The group of Photovoltaic cells forms the Solar Panel.

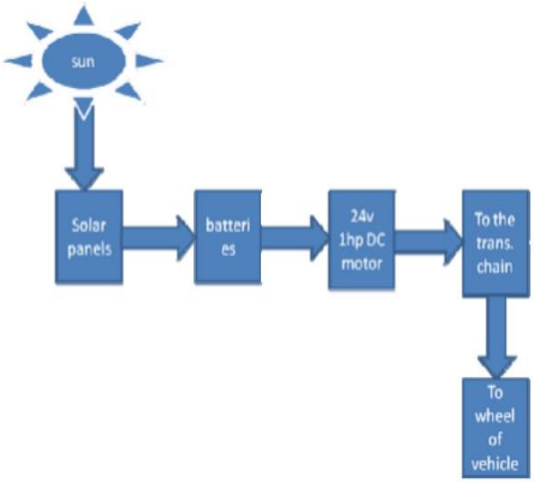


Fig 1.1

The fig 1.1 provides an overview of the process involved in the working of solar Power based Electric vehicle. For this Vehicles, the Solar insolation the Prime source of energy. The Solar Panels, the group of PV Cells with proper MPP Technique will generate the Electrical Energy.. The Electrical Energy obtained is used to Charge the batteries, which is used to run 24V DC Series Motor. The DC Series Motor is chosen as it has Very high Starting Torque. The shaft is used to Transmit the Power of the motor to the rear wheel of the vehicle.

The Proper Charging – Discharging Cycle of the Batteries are the most important concern. So the batteries are fully charged initially. And thereafter only, the Batteries are allowed to charge by the Solar panels output.

The Electric Vehicle is powered completely by the Solar Radiation. The Photovoltaic (PV) cells present in solar panels, convert the sun's energy into electric energy. Thus the Solar energy is used to power all the part of a vehicle for its propulsion.

Solar cars are powered by the sun's energy. The Major component of a solar Vehicle is its solar array, which collect the energy from the sun and converts it into usable electrical energy, The energy collected from the solar array is converted into the proper system voltage which will be fed to the Motor of the Drive. The Power Modulators such as converters adjusts the flow of energy to the motor, and then to the throttle. This Energy is used by the Motor to Drive the Wheel of the Vehicle.

COMPONENTS:

1. **SOLAR PANEL**
2. **BATTERY**
3. **DC MOTOR**
4. **WIRING SETUP**
5. **FRAME SUPPORT**
6. **CHAIN**

MANUFACTURING PROCESS:

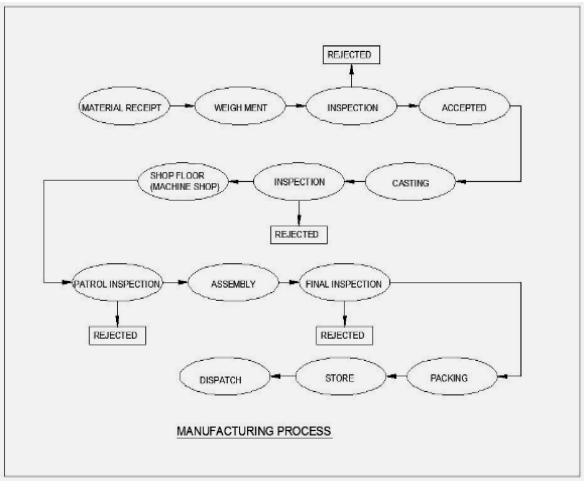


Fig 1.2

WORKING PROCESS:

PRINCIPLE OF WORKING OF DC MOTOR:

The DC MOTOR works on the principle laid in the FLEMMING'S left hand rule

SOLAR PANEL:

The Solar panels are used generate electricity by converting the sun's rays into energy. The car runs by using the energy that is stored in the batteries.

WIRING SETUP:

Electrical connections are made in series or in parallel to achieve a desired output voltage and/or desired current capability. The cells must be connected electrically to one another and to the rest of the system.

D.C. MOTOR (PERMANENT MAGNET):

An electric motor is a DC machine that converts electrical energy to mechanical energy. This conversion is based on the principle that whenever the current-carrying conductor is placed in a magnetic field, it experiences a magnetic force whose direction is given by Fleming's left-hand rule.

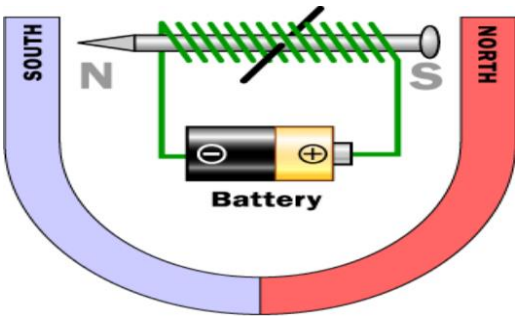


Fig 1.3

FRAME SUPPORT:

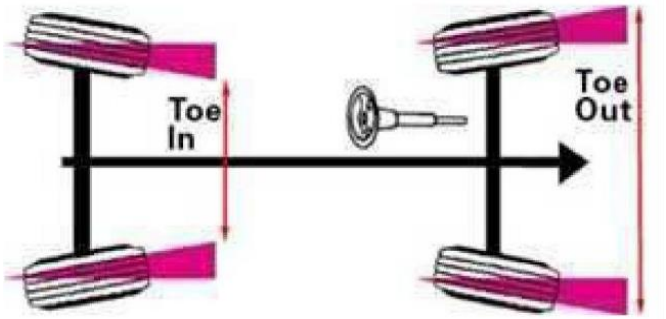
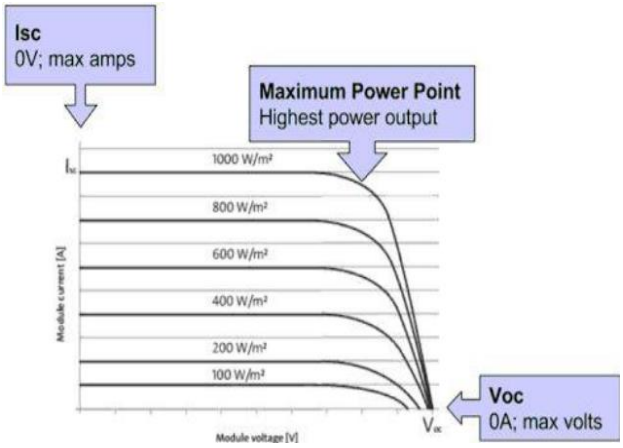


Fig 1.4

ANALYSIS:

Month	Electricity generated, supplied and excess electricity by the PV (kW)					Energy supplied to the inverter by the battery (kW)				Energy received by the inverter and supplied to the AC load (kW)			AC load (kW)
	Electricity generated	Charge the battery	Supplied to the inverter	Excess electricity generated	Losses	Battery alone	Battery with PV	Total supplied	Losses	Energy in	Energy out	Losses	
January	77.109	26.868	11.375	38.523	0.343	16.926	5.551	22.477	4.391	33.852	28.892	4.960	28.892
February	69.072	23.902	10.871	33.776	0.523	15.288	4.417	19.705	4.197	30.576	26.096	4.480	26.096
March	72.443	26.656	10.726	32.594	0.467	16.926	6.200	23.126	5.530	33.852	28.892	4.960	28.892
April	64.596	27.337	10.185	26.644	0.430	16.380	6.195	22.575	4.762	32.760	27.960	4.800	27.960
May	61.851	29.563	10.009	21.846	0.433	16.926	6.917	23.843	5.720	33.852	28.892	4.960	28.892
June	54.679	29.159	8.971	16.036	0.513	16.380	7.409	23.789	5.370	32.760	27.960	4.800	27.960
July	51.747	30.491	8.478	12.214	0.564	16.926	8.448	25.374	5.117	33.852	28.892	4.960	28.892
August	49.461	31.007	8.464	9.4810	0.509	16.926	8.462	25.388	5.619	33.852	28.892	4.960	28.892
September	52.154	30.789	8.047	12.956	0.362	16.380	8.333	24.713	6.076	32.760	27.960	4.800	27.960
October	59.964	30.055	8.890	20.615	0.404	16.926	8.036	24.962	5.093	33.852	28.892	4.960	28.892
November	66.798	30.044	9.457	26.581	0.716	16.380	6.923	23.303	6.741	32.760	27.960	4.800	27.960
December	74.212	29.061	10.936	34.161	0.054	16.926	5.990	22.916	6.145	33.852	28.892	4.960	28.892
Total	754.086	346.932	116.409	285.427	5.318	199.290	82.881	282.171	64.761	398.580	340.180	58.400	340.180

Motor voltage VS Motor current :



CONCLUSION

This project work has provided us an excellent opportunity and experience, to use our limited knowledge. We feel that the project work is a good solution to bridge the gates between institution and industries.

The "**FABRICATION OF MINI SOLAR VEHICLE**" is working with satisfactory conditions. As for this trailer is concerned in India, single piston arrangement is commonly used. Instead, with the same Piston arrangement available, repositioning the system with the help of the spur gears meshed normal to each other; the trailer can be lifted in the other two sides just by changing the position with the help of a motor connected with the battery.

Thus, we have developed a "**FABRICATION OF MINI SOLAR VEHICLE**" which helps to know how to achieve low cost automation. The operating procedure of this system is very simple. By using innovative techniques, this system can be modified and developed based on the human need in our day to day life.

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TITLE
HANDHELD TOURIST GUIDANCE SYSTEM USING GPS

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ABSTRACT:
The writing robot makes the written prescription chit about the patients with the help of wireless communication. The movement G-Code file created by the help of Inkscape software then the processing software is used to send the G-Code file to the microcontroller. Then the CNC shield drive sends the controlling signals to the stepper motors and servo motor. Now the XY axis which operates as follows by the instructions given to the controller unit. The corresponding code is send the data to controller block is interfaced with motor driver unit along the DAC provides the pulse width signal to motor unit where it is been processed and final output is written and displayed on the paper from the output unit. . The speech recognition circuit

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HANDHELD TOURIST GUIDANCE SYSTEM USING GPS

A PROJECT REPORT

Submitted by
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SALMAN N (3471855510)

in partial fulfillment for the award of the degree

of

BACHELOR OF ENGINEERING
in

ELECTRONICS AND COMMUNICATION ENGINEERING

PAIYANOOR,
CHENNAI-603104

MAY 2020

AARUPADAI VEEDU INSTITUTE OF TECHNOLOGY
VINAYAKA MISSION'S RESEARCH FOUNDATION
DEEMED TO BE UNIVERSITY
PAIYANOOR, CHENNAI 603 104

 ISBN: 978-93-5406-440-1

BONAFIDE CERTIFICATE

Certified that this Project Report **"MEDICAL PRESCRIPTION WRITING ROBOT "** is the bonafide work of **" *,SALMAN N , AKHIL KRISHNAN R ,ROSHITH BABU "*** who carried out the project work under my supervision.

SIGNATURE	SIGNATURE
HEAD OF THE DEPARTMENT	**SUPERVISOR**
Dr.L.K. HEMA, B.E, M.Tech, Ph.D.	**Mr.VIJAY, B.E, M.Tech**
Professor / HOD	Professor
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Kanchipuram District	Kanchipuram District
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Project Viva-Voce held on

INTERNAL EXAMINER **EXTERNAL EXAMINER**

 ISBN: 978-93-5406-440-1

DECLARATION

We affirm that the project work titled **" MEDICAL PRESCRIPTION WRITING ROBOT "**being submitted in partial fulfillment for the award of degree in B.E in Electronics and Communication Engineering is the original work carried out by us. It is not part of any other project work submitted for the award of any other degree or diploma, either in this or any other University.

AKHIL KRISHNAN R (3471855513)
ROSHITH BABU (3471855509)
SALMAN N (3471855510)

I certify that the Declaration made above by the candidates is true.

Signature of the Guide

Dr. VIJAY, B.E, M.Tech, Ph.D.
PROFESSOR / ECE

 ISBN: 978-93-5406-440-1

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CHAPTER 1

1. INTRODUCTION

Part of the reason why doctor's prescriptions are so difficult to decipher is that doctors make use of Latin abbreviations and medical terminology that most people don't ununderstand To perform the task, on-line human signing standards are created first. Robot writing task is performed using these standards after that and robot signatures are acquired as a result. Finally, recommendations of robot motion improvement are given.. It is capable of identifying all these commands.

After processing the speech, the necessary motion instructions are given to the mobile platform via a RF link. It gives exact concept of controlling a robot by voice. VCR is capable of understanding and synthesizing human's speech for communication.

A voice recognition unit built around a high speed processor that ensures various function of the system is performed by voice command. The speech recognition software used in VCR is speaker dependant.

The special feature of the software is the ability of the software to train itself for the voice commands for a particular user. The graphicaluser interface running along with the software provides a very convenient method for the users to train. It also It provides many other facilities in operating the robot.thousands ofvoice commands and perform required action. The voice recognition is a bit difficult task because each person has hisown accent. For that, the Robot voice uses Bit Voicer Serverwhich supports 17 languages from 26 countries and regions. These robotic assistants can be used for shaping, And manufacturing and tooling purposes in various sectors such as manufacturing, defence etc.

In hospitals, these roboticassistant can be used for the purpose of performing surgeries and operations with high precision. In this paper, we develop an assistant robot that can be operated using speech commands

1.1 AIM

The paper presents an approach to design rapid and fluid movements of a universal robot to perform robot writing mimicking the doctor prescription writing when signing and the trajectory.

Reading a doctor's handwritten prescription is a challenge that most patients and some pharmacists face; an issue that, in some cases, lead to negative consequences due to wrong deciphering of the prescription.

1.2 ABSTRACT

The writing robot makes the written prescription chit about the patients with the help of wireless communication. The movement G-Code file created by the help of Inkscape software then the processing software is used to send the G-Code file to the microcontroller. Then the CNC shield drive sends the controlling signals to the stepper motors and servo motor. Now the XY axis which operates as follows by the instructions given to the controller unit. The corresponding code is send the data to controller block is interfaced with motor driver unit along the DAC provides the pulse width signal to motor unit where it is been processed and final output is written and displayed on the paper from the output unit. . The speech recognition circuit

1.4 PROBLEM IDENTIFICATION

Doctors make use of Latin abbreviations and medical terminology that most people don't ununderstand To perform the task, on-line human signing standards are created first. Robot writing task is performed using these standards after that and robot signatures are acquired as a result. Finally, recommendations of robot motion improvement are given.. It is capable of identifying all these commands.

The writing robot makes the written prescription chit about the patients with the help of wireless communication. The movement G-Code file created by the help of Inkscape software then the processing software is used to send the G-Code file to the microcontroller. Then the CNC shield drive sends the controlling signals to the stepper motors and servo motor. Now the XY axis which operates as follows by the instructions given to the controller unit. The corresponding code is send the data to controller block is interfaced with motor driver unit along the DAC provides the pulse width signal to motor unit where it is been processed and final output is written and displayed on the paper from the output unit.

CHAPTER 2

2. LITERATURE SURVEY

There have been a number of research efforts into GPS based hand held tourist applications, and we provide an overview of two of these systems. To achieve the aims of the project we leverage a number of areas currently being investigated by others, context sensitive computing and mobile computing. The Distributive Multimedia Research Group at the Lancaster University has an ongoing project GUIDE (Cheverst et al., 2000) to investigate electronic tourist guides in a practical real-world environment. They have been building and testing different versions of electronic tourist guides for the city of Lancaster over the past few years. Their current approach is using wireless communication to a pen based tablet computer. Compared to our solution, the GUIDE uses a larger device (213mm x 153mm x 15mm in size and 850 grams in weight). This allows for an SVGA resolution display to support a traditional web browser style interface, supplying a rich information service to the user. The wireless communication allows an almost infinite data store for tourism information and services. Cyberguide (Abowd et al., 1997) is also a hand held electronic tourist guide system that supplies the user with context sensitive information. Initially Cyberguide was developed for indoor tours at the GVU. The system was extended to operate outdoors with GPS. The focus of this system was investigating context sensitive computing, and as such only limited support for tour creation was implemented. Context sensitive computing (Dey and Abowd, 2000, Herstad et al., 1999, Pascoe, 1998) refers to a program feature that changes depending on environmental conditions of the user during the operation of the application. Context may include: the user's location, people currently interacting with the user, time of day, and current user task. A simple example is of contextsensitive help that provides documentation for the particular feature that a user is in the process of using. Presentation of information and services may be adapted to suit user's changing tasks. With the advent of mobile phones and hand held computers, mobile computing is fast becoming the norm for personal information spaces (Siewiorek et al., 1998). The use of hand held computing devices communicating via a wireless network has been investigated as a means to facilitate collaboration by Fagrell et al.(Fagrell et al., 2000). Their architecture FieldWise is based on two application domains: first, mobile and distributed service electricians; and second, mobile news journalists. Munger proposes the use of pen-based computing as a means of improving emergency care (Munger, 1999).

CHAPTER 3

3. EXISTING AND PROPOSED SYSTEM

EXISTING SYSTEM

most people don't understand.

To perform the task, on-line human signing standards are created first. Robot writing task is performed using these standards after that and robot signatures are acquired as a result. Finally, recommendations of robot motion improvement are given.

Handicapped writing

Robot controlled by voice using mobile phone is very useful for physically challenged persons. It is also very useful in industries and at places where human life is endangered.

3.1 PROPOSED SYSTEM

The writing robot makes the written prescription chit about the patients with the help of wireless communication. The movement -Code file created by the help of Inkscape software then the processing software is used to send the G-Code file to the microcontroller. Then the CNC shield drive sends the controlling signals to the stepper motors and servo motor. Now the XY axis which operates as follows by the instructions given to the controller unit. The corresponding code is send the data to controller block is interfaced with motor driver unit along the DAC provides the pulse width signal to motor unit where it is been processed and final output is written and displayed on the paper from the output unit.

CHAPTER 4

4. PROPOSED SYSTEM DESIGN

4.1 ARCHITECTURE DIAGRAM

The architecture diagram of our proposed system has been shown below.

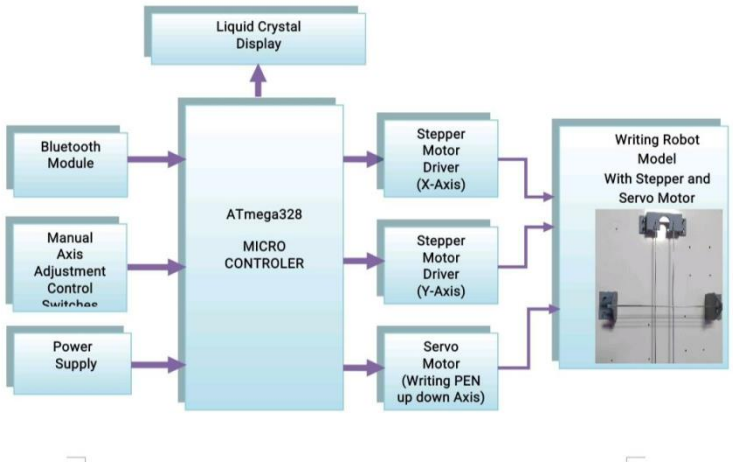

Fig 4.1 Architecturediagram

4.2 MODULE DESCRIPTION

1. ATMega328 MICRO CONTROLLER
2. Bluetooth Module
3. Stepper Motor Driver
4. Stepper Motors and Servo Motor
5. Gear and Belt Setups
6. Arduino Nano

4.2.1 ATMega328 MICRO CONTROLLER

ATmega328 is an 8-bit and 28 Pins AVR Microcontroller, manufactured by Microchip, follows RISC Architecure and has a flash type program memory of 32KB. It has an EEPROM memory of 1KB and its SRAM memory is of 2KB. ... It also has 3 builtin Timers, two of them are 8 Bit timers while the third one is 16-Bit Timer.

Specifications

Fig. 4.2.1 ATMega 328 MICROCONTROLLER

Technical specifications

Operating Voltage	5V
Input Voltage (recommended)	7-12V
Input Voltage (limits)	6-20V
Digital I/O Pins	14 (of which 6 provide PWM output)
Analog Input Pins	6
DC Current per I/O Pin	40 mA
DC Current for 3.3V Pin	50 mA
Flash Memory	32 KB (ATmega328) of which 0.5 KB used by bootloader
Clock Speed	16 MHz

Table. 4.2.1 Technical specifications

4.2.2 BLUETOOTH MODULE

A BlueTooth module is usually a hardware component that provides. a wireless product to work with the computer; or in some cases, the. bluetooth may be an accessory or peripheral, or a wireless headphone. or other product (such as cellphones can use.

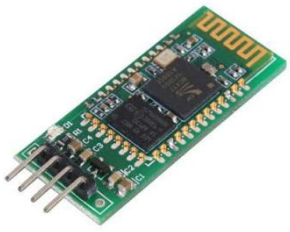

Fig. 4.2.2 BLUETOOTH MODULE

Features: (HC -05 is used here)

- Bluetooth protocal: Bluetooth Specification v2.0+EDR
- Frequency: 2.4GHz ISM band
- Modulation: GFSK(Gaussian Frequency Shift Keying)

- Emission power: ≤4dBm, Class 2
- Sensitivity: ≤-84dBm at 0.1% BER
- Speed: Asynchronous: 2.1Mbps(Max) / 160 kbps, Synchronous: 1Mbps/1Mbps
- Security: Authentication and encryption
- Profiles: Bluetooth serial port
- Power supply: +3.3VDC 50mA
- Working temperature: -20 ~ +75Centigrade
- Dimension: 26.9mm x 13mm x 2.2 mm

4.2.3 STEPPPER MOTOR

A stepper motor, also known as step motor or stepping motor, is a brushless DC electric motor that divides a full rotation into a number of equal steps. The motor's position can then be commanded to move and hold at one of these steps without any position sensor for feedback (an open-loop controller), as long as the motor is carefully sized to the application in respect to torque and speed.

Fig. 4.2.3 STEPPER MOTOR

Specifications

Size: 42.3 mm square × 48 mm, not including the shaft (NEMA 17)

Weight: 350 g (13 oz)

Shaft diameter: 5 mm “D”

Steps per revolution: 200.

Current rating: 1.2 A per coil.

Voltage rating: 4 V.

Resistance: 3.3 Ω per coil.

Holding torque: 3.2 kg-cm (44 oz-in)

4.2.4 STEPPER MOTOR DRIVER

A stepper motor driver (or stepper motor drive) is a circuit which is used to drive or run a stepper motor. It is often called a stepper motor driver. A stepper motor driver usually consists of a controller, a driver and the connections to the motor. A lot of drive circuits are available in the market today

The working principle of stepper motors is switching of its stator poles at logical LOW and HIGH values in such a way that it takes desired steps. ... If you want to control a stepper motor using a micro-controller, you need a stepper driver.

Fig. 4.2.6. STEPPER MOTOR DRIVER

The working principle of stepper motors is switching of its stator poles at logical LOW and HIGH values in such a way that it takes desired steps. ... If you want to control a stepper motor using a micro-controller, you need a stepper driver.Stepper motors are DC motors that move in discrete steps. They have multiple coils that are organized in groups called "phases". By energizing each phase in sequence, the motor will rotate, one step at a time. With a computer controlled stepping you can achieve very precise positioning and/or speed control

Driver is nothing but a circuit arranged to make switching simple and “secure”. The voltage rating of stepper driver is more than micro-controller. So you can easily control the stepper motor of given voltage rating using driver of that rating.

4.25 SERVO MOTORS

The function of the servo motor is to receive a control signal that represents a desired output position of the servo shaft and apply power to its DC motor until its shaft turns to that position.Servos are used in radio-controlled airplanes to position control surfaces like elevators, rudders, walking a robot, or operating grippers. Servo motors are small, have built-in control circuitry and have good power for their size.

Fig. 4.2.7. Servo Motor

The motor is paired with some type of position encoder to provide position and speed feedback. In the simplest case, only the position is measured. The measured position of the output is compared to the command position, the external input to the controller. If the output position differs from that required, an error signal is generated which then causes the motor to rotate in either direction, as needed to bring the output shaft to the appropriate position. As the positions approach, the error signal reduces to zero and the motor stops.

The very simplest servomotors use position-only sensing via a potentiometer and bang-bang control of their motor; the motor always rotates at full speed (or is stopped). This type of servomotor is not widely used in industrial motion control, but it forms the basis of the simple and cheap servos used for radio-controlled models.

More sophisticated servomotors use optical rotary encoders to measure the speed of the output shaft and a variable-speed drive to control the motor speed. Both of these enhancements, usually in combination with a PID control algorithm, allow the servomotor to be brought to its commanded position more quickly and more precisely, with less overshooting

4.2.8 GEAR AND BELT SETUPS

Gears are mechanical parts with cut teeth designed to mesh with teeth on another part so as to transmit or receive force and motion. The cut teeth are also sometimes called cogs. Others like in chainsaws and motors can be tweaked. In Robotics Gears are used to transfer rotational forces between axles.

Gears and belts transmit rotary motion from one shaft to another, often changing speed and torque in the process. Gears and belts transmit rotary motion from one shaft to another, often changing speed and torque in the process. Gear sets are generally used where the two shafts are close together.

SOFTWARES USED

EMBEDDED C

Android Application

AVR IDE

Java

SOFTWARE DESCRIPTION

Embedded C

Embedded C programming typically requires nonstandard extensions to the C language in order to support enhanced microprocessor features such as fixed-point arithmetic, multiple distinct memory banks, and basic I/O operations. In 2008, the C Standards Committee extended the C language to address such capabilities by providing a common standard for all implementations to adhere to. It includes a number of features not available in normal C, such as fixed-point arithmetic, named address spaces and basic I/O hardware addressing. Embedded C uses most of the syntax and semantics of standard C, e.g., main() function, variable definition, datatype declaration, conditional statements (if, switch case), loops (while, for), functions, arrays and strings, structures and union, bit operations, macros, etc

Android Application

Android software development is the process by which new applications are created for devices running the Android operating system. Google states that "Android apps can be written using Kotlin, Java, and C++ languages" using the Android software development kit, while using other languages is also possible

All non-JVM languages, such as Go, JavaScript, C, C++ or assembly, need the help of JVM language code, that may be supplied by tools, likely with restricted API support. Some programming languages and tools allow cross-platform app support (i.e. for both Android and iOS). Third party tools, development environments, and language support have also continued to evolve and expand since the initial SDK was released in 2008. In addition, with major business entities like Walmart, Amazon, and Bank of America eyeing to engage and sell through mobiles, mobile application development is witnessing a transformation.[4] The official Android app distribution

mechanism to end users is Google Play; it also allows staged gradual app release, as well as distribution of pre-release app versions to testers.

AVR IDE

AVR studio is an Integrated Development Environment (IDE) developed by ATMEL for developing different embedded applications based on 8-bit AVR microcontroller. ... By installing WinAVR allow AVR Studio to detect the compiler.

AVR. Stands for "Audio/Video Receiver." An AVR, often called a receiver, is the central routing and processing component in a home theater

Whereas Atmel Studio is a Visual Basic and . NET Framework based IDE which only supports AVR and ARM architecture based MCU's only by Atmel. It also supports compilation and debugging of Embedded C and Assembly code.

Java

Most used languages in the market these days. Below graph shows a graphical representation of a company for all languages. JavaScript stands second in the lineup. It is mainly used in building websites and web applications.

It was originally developed by Netscape as a means to add dynamic and interactive elements to websites. ... Like server-side scripting languages, such as PHP and ASP, JavaScript code can be inserted anywhere within the HTML of a webpage

4.5 MERITS AND DEMERITS

4.5.1 MERITS OF THE PROPOSED SYSTEM

- Can be used for blind people
- Not only for medical prescription writing but also we can use it for writing anything
- Good for physically differently abled friends
- Can Cary anywhere because of its comparatively low size than the normal printers
- Low size

4.5.2 DEMERITS OF THE PROPOSED SYSTEM

- Heigh initial cost
- Difference in slang may leads to writing mistakes
- Needs to install G codes for each and every words which is very heigh cost
- Need computer and Android mobile phone for working (further make it more expensive and uneasy to carry)

CHAPTER 5

5. RESULT AND DISCUSSION

A prototype has been designed and developed which consists of ATMega 328 microcontroller and Bluetooth module and motors

5.1 RESULT ANALYSIS

Works as we expected and it can be used not only for writing medical prescription but also we can use it to help blind friends differently abled friends to write , hope it make a revolution in the writing history

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Robot Voice A Voice Controlled Robot using
Arduino
VINEETH TEEDA, K.SUJATHA, RAKESH MUTUKURU

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TITLE

VEHICLE TO VEHICLE BASED SPEED MANIPULATION SYSTEM FOR COLLISION AVOIDANCE USING CAN PROTOCOL

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ABSTRACT:
The motive of our project is to mitigate the number of road accidents by warning the driver of the vehicle way head in case of possible collision due to speedy driving, providing the vehicle with the speed data of the adjacent vehicle so that an intelligent speed control mechanism could be adopted in controlling the vehicle's speed, irrespective of the driver's response. Speed of the adjacent vehicle is captured via wireless transceiver and logged into a dedicated Electronic control unit(ECU). The concerned vehicle's speed is sensed and captured. A comparison is made between both the data units, where communication is established via CAN protocol. CAN protocol involve communication between various controllers without the involvement of a host computer which finds a wide application in automotive industry. The speed from both the vehicle is compared and in case of high speed of the adjacent vehicle, the speed of the concerned vehicle is reduced relatively. Thus, the proneness of accidents is greatly avoided which in turn pulls down the accident rate thereby saving more lives.

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VEHICLE TO VEHICLE BASED SPEED MANIPULATION SYSTEM FOR COLLISION AVOIDANCE USING CAN PROTOCOL

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Abstract-- ***The motive of our project is to mitigate the number of road accidents by warning the driver of the vehicle way head in case of possible collision due to speedy driving, providing the vehicle with the speed data of the adjacent vehicle so that an intelligent speed control mechanism could be adopted in controlling the vehicle's speed, irrespective of the driver's response. Speed of the adjacent vehicle is captured via wireless transceiver and logged into a dedicated Electronic control unit(ECU). The concerned vehicle's speed is sensed and captured. A comparison is made between both the data units, where communication is established via CAN protocol. CAN protocol involve communication between various controllers without the involvement of a host computer which finds a wide application in automotive industry. The speed from both the vehicle is compared and in case of high speed of the adjacent vehicle, the speed of the concerned vehicle is reduced relatively. Thus, the proneness of accidents is greatly avoided which in turn pulls down the accident rate thereby saving more lives.***

Keywords—Vehicles; Wireless Transceiver; CAN; Controllers.

I. Introduction

Traffic accidents takes hundreds of lives each year, outnumbering any deadly diseases or natural disasters. Many studies show that about 60% of roadway accidents could be avoided if the driver of the vehicle was provided warning at least one-half second prior to an accident.

Human drivers suffer from perception limitations on route emergency events, leading to giant delay in propagating emergency warning.

The collision warning system is implemented as a part of vehicle safety systems, thus reducing the number of accidents. To be effective, such a system must have the capability of supporting real time systems that can warn drivers of an impending accident. The proposed paper is to mitigate the road accident by controlling the speed of adjacent vehicle. Controller area network (CAN or CAN-bus), a vehicle bus standard designed for microcontrollers and devices to speak among one another within a vehicle without an intermediate or host Computer. CAN is a message based protocol, designed for automotive applications but it is also used in other areas such as industrial automation and medical equipment. CAN is a multi-master broadcast serial bus standard used for connecting electronic control units (ECUs). Each node is able to transmit and receive messages, but not simultaneously among each other. The vehicle's speed is sensed and captured. A comparison is made between both the data units, where communication is established via CAN protocol. The speed from both the vehicle is compared and in case of high speed of the adjacent vehicle, the speed of the concerned vehicle is reduced relatively.

II. Literature Survey

2.1 survey paper - 1

2.1.1 Introduction

Collision Avoidance systems is a subsequent procedure to collision mitigation is one of the Great challenge in the area of active safety for road vehicles. In India, the total annual mortality due to road accidents has reached 1.18 lakh, based on the report of National Crime Records Bureau (NCRB). If these deficiencies are not controlled at early stages they might cause huge economic problems affecting the road side networks. The most important part of the work was to carry out a feasibility study on vehicle collision avoidance system using wireless sensor networks. The collision avoidance can be done by means of using Laser sensor. Vehicle collision avoidance system can be detected using Laser rays with the laser transmitter and laser receiver. Laser transmitter is connected with the laser sensor.
CAN controller is connected to the all aspects of the nodes and transmits the knowledge via Zigbee and send the message to the LCD output on the motive force side.

2.1.2 Technology used

The vehicle collision avoidance system can be done by laser rays i.e., laser transmitter &laser receiver. This paper's nature of work is used to avoid the collision of vehicles in many directions. For this we are calculating for all side of directions. In case the cars are moving in front direction so need to worry about the other directions like back and other two sides. The driver can assume that some vehicle coming in other directions and we can easily stop the car at the same time in case the driver is not listening to the LCD means it can fix one alarm for indication purpose. So the sensor senses and sends the message to the LCD and alarms start to rings which means we can easily save the car from any tragedy or accidents. The picture can be taken as front and back side image collision. Here they are using the methodology based on the avoidance of collision in Laser rays. Here in this paper for further future improvement it can implement in real time means use on Radar also can be done.
The automobile goes before aspect means that if any vehicles coming back before or back aspect means that our sensing element can sense and send the message to the LCD or alarm.
The driver can easily avoid the car from getting accidents.

2.1.4 Drawbacks

The proposed model is not reliable of road-side testing techniques, while seeking for new and emerging technologies in Laser rays or that aid the avoidance of collision in the road-sides networks.

2.1.5 Result
This concept is mainly to avoid the collision in the road-side vehicles with further enhancements. Hence we can say if this concept was implements in real time systems it will get success means we can say as Accident free vehicle collision system.

2.2 survey paper – 2

2.2.1 Introduction

2.2.2 Technology used

In this paper, an automatic vehicle anti-collision device Ultrasonic range finder and creating electromagnetic field which helps to repels vehicles. This paper work is motivated from the local traffic condition of hilly Areas specially where slow moving traffic on hilly roads often results in minor or major accidents. On ascending or descending a hilly road in traffic sometimes causes accidents while overtaking, sudden braking on turns, and loss of control while ascending on uphill roads.
The device device which can not solely give driver a secure warning however conjointly mechanically actuates the protection switches on stipulated time before uncommon state of affairs.2.2.3 Advantages
This system is reliable, cost-efficient and fault tolerable. These characteristics enable the vehicle anti-collision in adaptive control environment.

2.2.4 Drawbacks

This system, if developed with GPS to log the position of collided vehicles to the emergency helpline then it might had increased the efficiency of this system.

2.2.5 Result

This paper that has been planned is analyzed and also the effectiveness of an energetic vehicles anti-collision system the inaudible vary finder, excitation circuit and GSM are working properly.
The module was successfully developed and tested in the laboratory with lab environmental conditions.
The inaudible was ready to live the info up to 500cms distance and below 200cms excitation circuit begin operating.
The results are accurate with a minimum tolerance value.

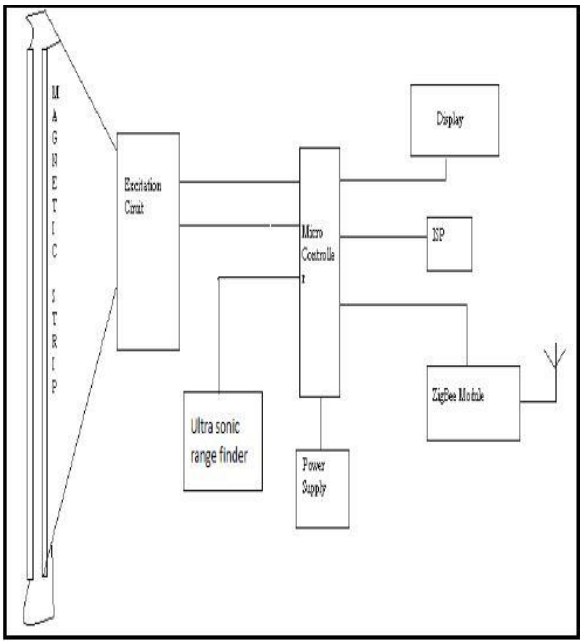

Figure 1.Block diagram

2.3 survey paper – 3

2.3.1 Introduction

The rise of vehicles on the roads will increase the demand of various info and communication technologies to be immensely out there over the road networks for best vehicle collision rejection activities.
The frequently occurring vehicle collision occurring in the present situation is the forward vehicle collisions. The forward vehicle collision occurs when a vehicle going in high speed and tries to overtake other vehicle to reach earlier at a particular crossing.
The previous works on vehicle collision rejection systems failed to enlighten regarding the integrated use of various info and communication technologies (ICT) for collision rejection activity.
In this paper, a novel methodology was implemented in programming language C++ for forward vehicle collision avoidance by integration of different information and communication technologies (ICT) i.e different geographical positioning and sensor based techniques at crossings and intersections like low cost camera, GPS, long range ultrasonic distance sensor and also does vehicle to vehicle communication through dedicated short range communication(DSRC) i.e. Bluetooth at intersections.

2.3.2 Technology used

In this paper a methodology has been implemented in programming language C++ for forward vehicle collision avoidance by integration of information and communication technologies (ICT) at intersections or crossings is proposed. This methodology does the forward vehicle to vehicle collision avoidance or accidents through integration of low cost camera, GPS, long range distance sensor and also does vehicle to vehicle communication through dedicated short range communication (DSRC) i.e. bluetooth at intersections and describes its behaviour in different situations of forward collision avoidance or accidents. This methodology makes use of a low cost video sensor e.g video camera for detection of color of traffic lights at intersection or crossings and also for detection of front moving vehicles, low cost GPS with antenna for finding the location of the vehicle and bluetooth for vehicle to vehicle communication. The long range ultrasonic distance sensor with range of about (0.5m to 15 m) and a speed radar gun are meant for measuring of relative distance and relative speed from intersections or from other vehicle respectively.

2.3.3 Advantages

A novel methodology which was implemented in programming language C++ for forward vehicle collision avoidance or accidents by integration of different information and communication technologies (ICT) i.e different geographical positioning and sensor based on techniques at intersections and crossings like low cost camera, GPS, long range ultrasonic distance sensor and also does vehicle to vehicle communication through dedicated short range communication (DSRC) i.e bluetooth at intersections. Few trial test data was taken at Roorkee city, intersection and was given as input to the C++ implementation of the methodology proposed. The method was found to be efficient for collision avoidance at intersections.

2.3.4 Drawbacks

This proposed methodology has been used in road junctions or intersections. This methodology has been tested in lab environment and few times in the real time scenario. Hence it has to be tested in a real time scenario in order to prove it's efficiency.

2.3.5 Result

The proposed methodology for collision avoidance is
efficient and effective over road network of vehicle
competing to get earlier to the intersection or crossing. It may be improved by implementing it in real time rigorously and for enough time to prove its usefulness. Hence, the comparison with other forward collision or accident methodologies can also be made easily. The other improvement may be of implementation of effective DSRC techniques for vehicle to vehicle communication in future.

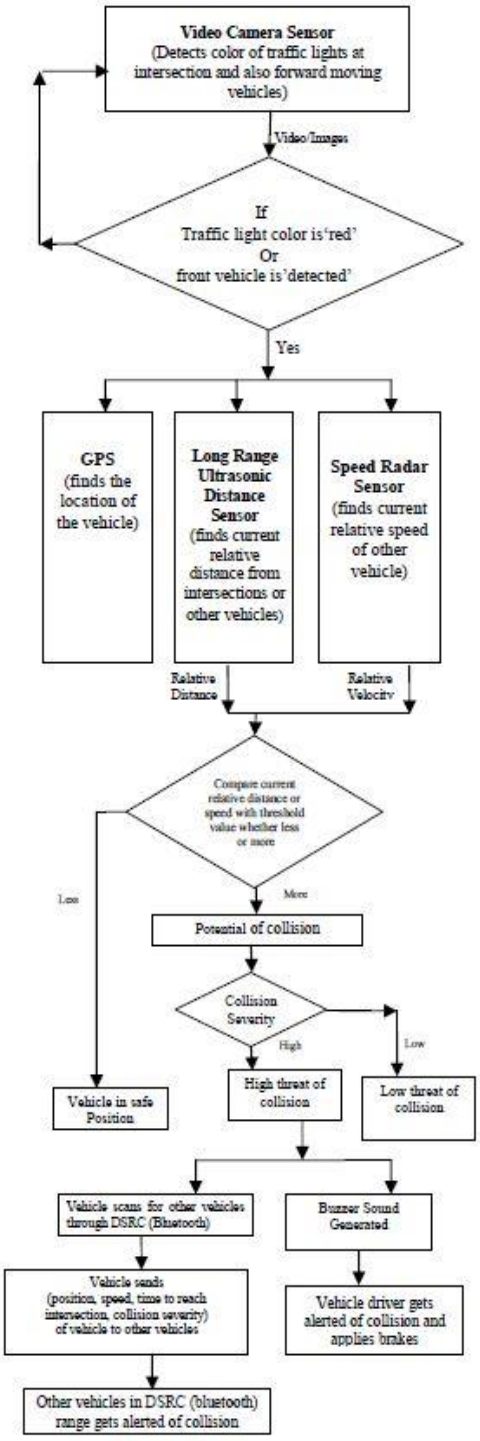

Fig 2. Flow chart

2.4 survey paper – 4

2.4.1 Introduction

This paper describes the implementation of a multi-vehicle supervisor to avoid collisions at intersections or crossings. The experiments are performed on an intersection or crossings testbed consisting of three RC cars. Here, it accounts for uncertainty in car dynamics and state measurements and therefore the presence of an uncontrolled car, which is human-driven. The controller

overrides the controlled cars only when necessary to prevent a possible future collision or accident. Through the experiments, it's demonstrated that intersection collisions are avoided, that is, the cars continuously and safely run on the paths no end 92.8% of the days .

2.4.2 Technology used

Here it is considered, a semi-autonomous controller, called a supervisor or controller, that employs a scheduling approach to maintain intersection safety. When a future collision is detected, the supervisor overrides cars to guarantee safety regardless of uncertainty in the dynamic model of the cars and state measurements. This supervisor or controller is validated through experiments performed on an intersection testbed composed of three RC cars. One of the cars is human-driven and "uncontrolled" by the supervisor or controller. The other cars which are controlled by on-board computers, drive them at a constant speed, until the supervisor intervenes to avoid collisions.

2.4.3 Advantages

The proposed method supervisors overrides controlled cars only when future collisions or accidents would otherwise become unavoidable. This supervisor accounts for 1) modelling and measurement uncertainty, and 2) the presence of an uncontrolled vehicle. It particularly includes these uncertainty sources in the algorithm allows us to implement the system on an experimental platform.

2.4.4 Drawbacks

This proposed method uses semi-autonomous controller vehicles. Hence when they come in contact with normal vehicles it may not respond properly

.

2.4.5 Result

The system presented here prevents collisions and accidents at one conflict point, future work will consider multiple conflict points such as found in real traffic intersections. As the intersections or crossings are modelled in more detail, the challenge is to overcome significantly increasing computational complexity. Also, since the routes of vehicles may not be known in advance, a supervisor or controller will have to consider all possible routes of vehicles and progressively deny infeasible ones.

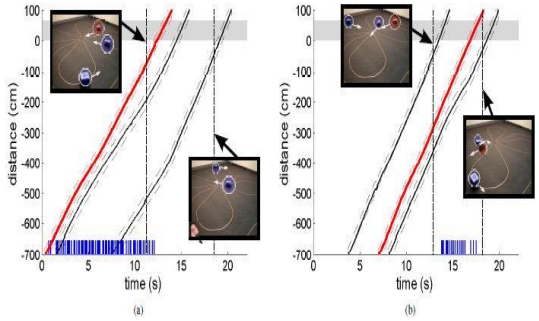

Figure 3.Block diagram

I. Proposed System

The proposed has been designed in order to overcome the drawbacks comprised in the above system. Our proposed system helps to aid both the user and the librarian. It helps to reduce the manual work of the librarian and it provides time consumption to the user.
The system works based on the accelerator input, the rate of fuel flow given to the engine and the speed is controlled accordingly. If the vehicle needs to run at high speed the accelerator pedal has to be pressed more so that it supplies more fuel to the engine. In this method the drivers concentration is much more and always alert to take necessary control actions depends on the traffic situation.

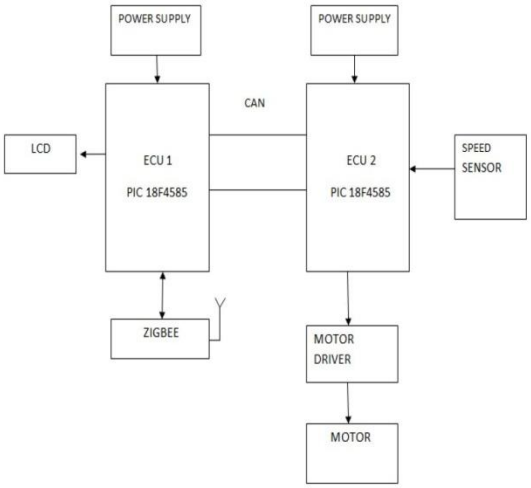

Figure 4. Block Diagram of Proposed System

3.1 Technology used

The proposed paper is to mitigate the road accident by controlling the speed of adjacent vehicle.
Controller space network (CAN or CAN-bus) could be a vehicle bus commonplace permits microcontrollers and devices to speak with one another among a vehicle while not a number laptop.
CAN could be a message based mostly protocol that is intended specifically for automotive applications however currently conjointly it's utilized in different areas like industrial automation and medical instrumentation.
CAN is a multi-master broadcast serial bus standard to connect electronic control units (ECUs). Each node will be able to transmit and receive messages, but not simultaneously. The concerned vehicle's speed is sensed and captured. A comparison is made between both the data units, where communication is established via CAN protocol. The speed from both the vehicle is compared and in case of high speed of the adjacent vehicle, the speed of the concerned vehicle is reduced relatively.

II. **Results**

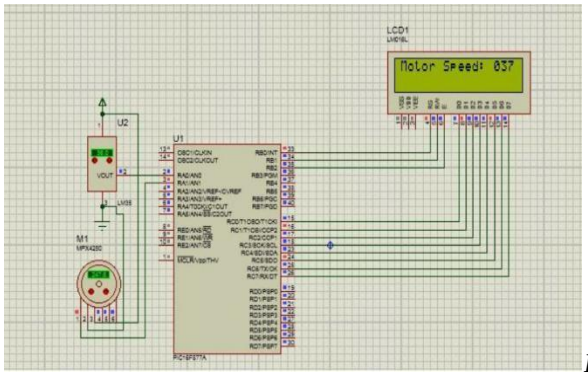

Figure 5 Simulation Image 1

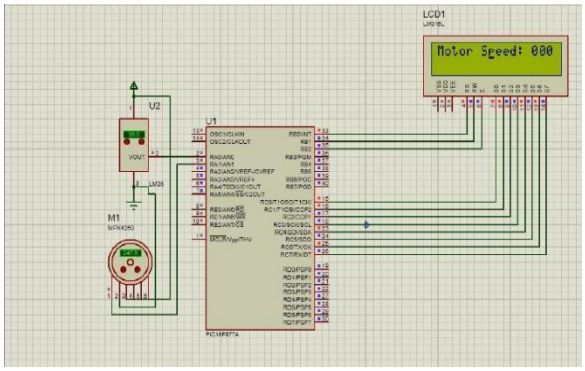

Figure 6 Simulation Image 2

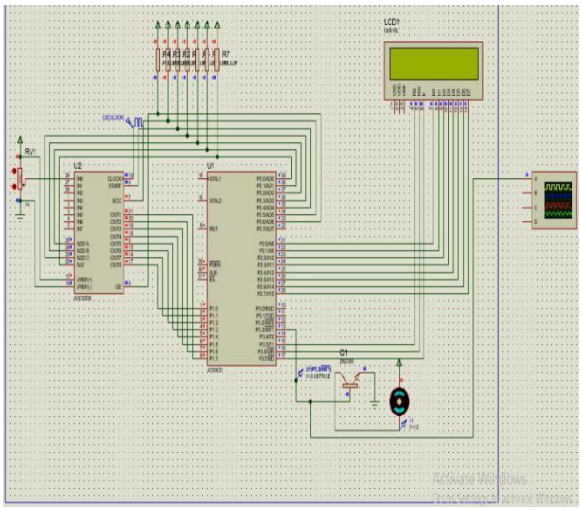

Figure 7 Simulation Image 3

III. **Conclusion**

In this project we have achieved to mitigate the road accident by controlling the speed of the adjacent vehicle is captured via wireless transceiver and logged into a dedicated Electronic control unit (ECU). The concerned vehicle's speed is sensed and captured. A comparison is made between both the data units, where communication is established via CAN protocol.

CAN controller is connected to vehicle and send the knowledge via zigbee and transmit message to the LCD output on the motive force facet.

The speed from both the vehicle are compared and in case of high speed of the adjacent vehicle, the speed of the concerned vehicle is reduced relatively. Ultrasonic sensor also used to detect the obstacles in front of vehicles. If there is no obstacles the vehicle can move easily

Intelligent Vehicle Communication system provides safety and security to lives. The proposed system allows the vehicles to exchange the data regarding the collision and distance of the obstacle. Based on the received information, the vehicle speed is automatically reduced and the speed values are displayed through the LCD. The proposed system is demonstrated and the outputs are obtained subjected to the real time environment using can protocol. This system has the main advantage of reducing ro

ad crashes and saves lives

The proposed methodology for collision avoidance is efficient and effective over road network of vehicle to get earlier to the intersection. It may be improved by implementing it in real time rigorously and for enough time to prove its usefulness. Hence, the comparison with other forward collision methodologies can also be made easily. The other improvement may be of implementation of effective techniques for vehicle to vehicle communication in future.

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TITLE

A Three-Port DC-DC Converter Based Distributed DC Grid Connected PV System With Island System Output Voltage Allocation Control by usingP& O Method

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ABSTRACT:
A circulated dc network associated photovoltaic (PV) age design dependent on half breed associated three-port dc –dc converters (TPCs) and its control procedure are proposed in this paper. The proposed framework comprises of numerous modular PWM plus phase-shift (PPS) controlled TPCs, which includes soft-switching and low voltage stress. The input-port of each TPC is connected to an independent PV energy source to accomplish individual MPPT, and the output-ports of these TPCs are associated in series arrangement to interface with a high-voltage (HV) dc bus, while the bidirectional-ports are in parallel to build a low-voltage (LV) dc bus. The mismatch power of input sources can be transferred through the LV dc bus among these TPCs, and the power and voltage balancing at the high-voltage output side can be realized.To reduce the mismatch power at the input and output side perturb and observe techniques is used. By directing the voltage reference of a bidirectional port in a linear relationship with the yield voltage, yield voltage sharing is acknowledged with just the module's own voltage and current being detected. Simulation and experimental results are given to confirm the viability and points of interest of the proposed design and control procedure.

A Three-Port DC-DC Converter Based Distributed DC Grid Connected PV System With Island System Output Voltage Allocation Control by using P& O Method

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Abstract-

A circulated dc network associated photovoltaic (PV) age design dependent on half breed associated three-port dc –dc converters (TPCs) and its control procedure are proposed in this paper. The proposed framework comprises of numerous modular PWM plus phase-shift (PPS) controlled TPCs, which includes soft-switching and low voltage stress. The input-port of each TPC is connected to an independent PV energy source to accomplish individual MPPT, and the output-ports of these TPCs are associated in series arrangement to interface with a high-voltage (HV) dc bus, while the bidirectional-ports are in parallel to build a low-voltage (LV) dc bus. The mismatch power of input sources can be transferred through the LV dc bus among these TPCs, and the power and voltage balancing at the high-voltage output side can be realized.To reduce the mismatch power at the input and output side perturb and observe techniques is used. By directing the voltage reference of a bidirectional port in a linear relationship with the yield voltage, yield voltage sharing is acknowledged with just the module's own voltage and current being detected. Simulation and experimental results are given to confirm the viability and points of interest of the proposed design and control procedure.

Keywords: Three port DC-DC converter

I.INTRODUCTION

Sustainable power source sources,like photovoltaic (PV) vitality, are drawing noteworthy consideration around the globe and are turning out to be reasonable elective sources to overcome natural contamination and energy storage deficiency issues.PV vitality sources have proliferate quickly as of late and are anticipated to have the best development on the politically influential nation advertise in the following ten years.The large-scale integration of PV array system into grid causes challenges to optimize the employment of these non conventional energy sources. Presently distribution systems are mainly based on ac technology. Cascaded multilevel converters have been utilized to associate enormous scope PV generation systems to the medium-voltage (MV) AC distribution system, because of the benefits of measured quality, low gadget rating, low harmonics and high ac voltage ability and so forth .However, the ac grid connected approach highlights multi-stage power transformation, which brings about diminished system performance. The dc grid has been considered to have the highlights of lesser loss, higher exchange power, significant distance transmission ability, better dependability and controllability, increasingly helpful to flexibly the dc load, etc.

The amount of electric power generated by solar PV arrary depends on environmental factors like irradiation level, temperature etc. The dc-dc converters are used to get the regulated output voltage from the solar panel. Among the different types of converter topologies, boost converters are employed in most of the PV system for voltage regulation at the side of LV dc bus where as for HV side dc bus system three port dc-dc converter is preferred.

II. LITERATURE REVIEW

Z.Liang, R.Guo,J.Li, and A.Q. Huang [1] presents an three port converter backlight driving system for large-scale liquid crystal display panels. High efficiency, high power factor, circuit simplicity, and low cost can be achieved by using a single-stage charge-pump asymmetrical half-bridge converter. To regulate the LED current and brightness for the three port converter backlight system, some current sharing methods are presented and compared. The requirements for the current sharing and luminance balance among paralleled LED arrays can be satisfied while current ripple is eliminated significantly. Because of the addition of bypass diodes, an alternative current path can be

offered when a single LED fails. The LED array will not be extinguished. Reliability of the LED backlight system can thus be improved effectively.

M. Malinowski, J. I. Leon, and H. Abu-Rub
[2]designed a new three port converter or dealing with reconstructions of the existing ones, lighting designers usually do not take into consideration all of the available means for energy savings and optimal performance. This paper offers a set of the most important recommendations regarding the relevant influencing factors for energy savings in street lighting, the majority of which represent the results and conclusions of original research. Recommendations which result from user needs and regard visual quality are also briefly presented. Taking all of these recommendations into account provides improvement of appearance and sense of security, as well as energy and cost savings.

C. Wang, K. Zhang, L. Liu, and W. Liu[3] explain light-emitting diodes (LEDs) may have a very long life, poorly designed LED lighting systems can experience a short life. Because heat at the p-n-junction is one of the main factors that affect the life of the LED, by knowing the relationship between life and heat, LED system manufacturers can design and build long-lasting systems. In this study, several white LEDs from the same manufacturer were subjected to life tests at different ambient temperatures. The exponential decay of light output as a function of time provided a convenient method to rapidly estimate life by data extrapolation. The life of these LEDs decreases in an exponential manner with increasing temperature. In a second experiment, several high-power white LEDs from different manufacturers were life-tested under similar conditions. Results show that the different products have significantly different life values.

M. Starke, L. M. Tolbert, and B. Ozpineci [8] proposes a three port dc-dc converter. The proposed circuit is the alone three port converter in the conversion of dc-dc converter.The proposed single-stage converter which has power factor correction and output voltage regulation features can simplify circuit complexity, reduce cost, and increase system reliability over conventional two-stage systems. Experimental results of a 100 W prototype are used to verify the feasibility and validity of the theoretical predictions.

III.EXISTING SYSTEM

In the existing system we use the boost converters. It is defined as boost converter (step-up converter) is a DC-DC power converter that steps up voltage (while stepping down current) from its input (supply) to its output (load). It is a class of switch mode power supply (SMPS) containing at least two semiconductors diode, inductor, pulse generator.

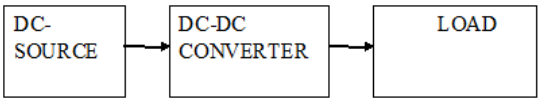

Fig 1.Block diagram of the dc-dc converter

The drawbacks of existing system is large output capacitor is required to reduce ripple voltage as output current is pulsating, slower transient response and difficult feedback loop compensation due to presence of right half zero in continuous conduction mode (CCM) boost converter.

IV PROPOSED SYSTEM

In the proposed system we use the three port dc-dc converter. Three port converter are used in renewable energy applications. The converter can deliver energy from each input source in an independently way or in a mixed form , but also the battery can be charged from the renewable source if it is required.

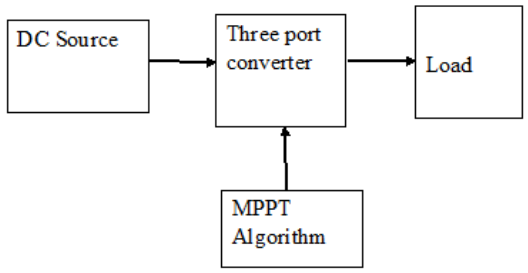

Fig 2.Block –diagram of the proposed system

In order to reduce the mismatch power at the LV dc bus ,power and voltage balancing at the HV side three port dc-dc converter is used.

MPPT Method

MPPT algorithm continuously adjust the converter voltage to ensure that the system operates at max power point on the PV curve under all condition. To extract maximum power from the solar PV panel it is necessary to have additional controller .Here MPPT act as additional controller and it is connected between source and load. The function of the controller is to identify the correct value of maximum power point with respect to change in temperature,change in irradiance. The conventional MPPT algorithm are perturb & observe ,Incremental conductance ,Hill climbing algorithm.

The principle of perturb and observe consists of

I. creating a perturbation

II. varying the voltage

III. observing the resulting variation of the power.

Typically, P&O method is used for tracking the MPP. In this technique, a minor perturbation is introduced to, cause the power variation of the PV module. The PV output power is periodically measured and compared with the previous power.

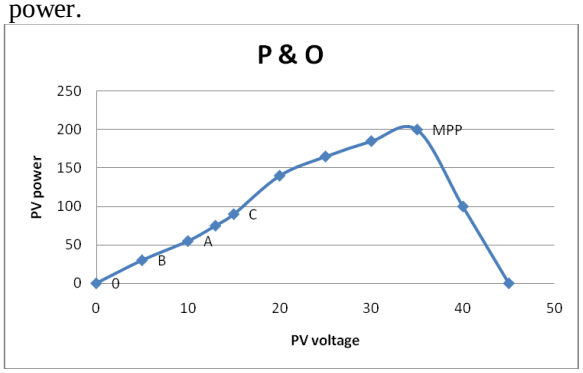

Fig 3.PV curve

P & O MPPT observe(dp/dv) after every perturbation and decide the next perturbation based on this value.
In the characteristic curve fig.3 the point MPP denote the operating point of the system and at that point value of dp/dv is zero.On the left hand side of MPP the dp/dv value is positive.consider a point A on the left hand side of MPP now small perturbation is made in voltage make the point to move towards C i.e it converge towards the MPP.In this case when point shifted from A to C it means that perturbation in voltage cause increase in dp/dv value.Suppose a small perturbation in voltage shift the point from A to B i.e divergence takes place.Based up on the value of dp/dv it decide in which direction it should move on the curve.

V EXPERIMENTAL RESULTS

A. Simulation Model

The simulink model of PV arrary,three port dc-dc converter ,PWM pulse generator and MPPT controller is shown in fig 4.The purpose of three port dc-dc converter is to regulate the voltage and to reduce the mismatch occurred in voltage and power at the LV and HV dc bus .The purpose of MPPT is used to monitor the maximum power point, the tracked value is given to the converter.Converter has to adjust the voltage in such a way solar PV system work at maximum power point.

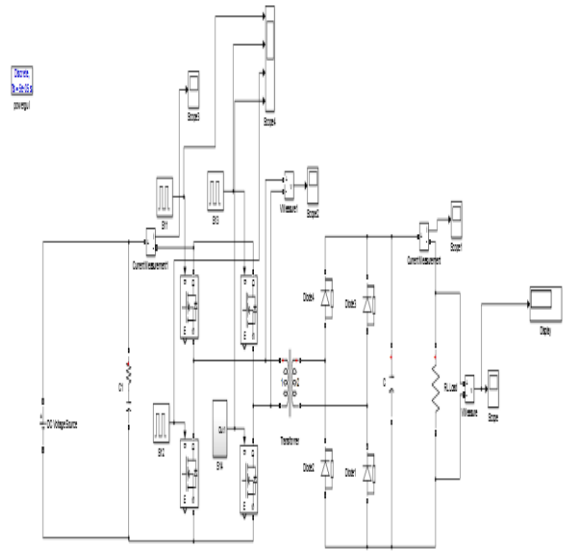

Fig.4 Experimental setup used for testing

B. Simulation Result

To balance the power and voltage normal PWM pulse phasor shift control strategy is used.Multiple modular PWM phasor shift generate the pulse required for MOSFET which is present in the three port dc-dc converter.

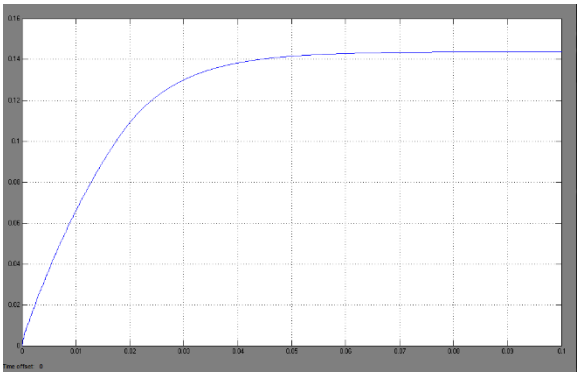

Fig 5. Current Vs Time

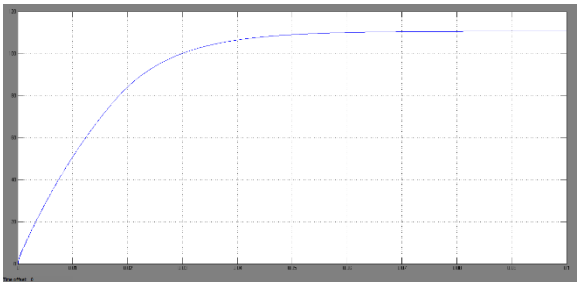

Fig 6.Voltage Vs Time

In fig 5 & fig 6 the rapid mismatch in voltage and current occurs for 0.05 seconds after that it settle down slowly to attain a steady state.

VI CONCLUSION

From simulation and experimental tests, it can be seen that the output voltage and PV power can be controlled independently by using multiple PWM techniques.In this proposed work PV panel is connected to the HV dc bus through the three port dc-dc converter in cascaded form .This power electronics component causes mismatch in power at the LV dc bus and voltage and power imbalancing at the HV dc bus . By using perturb and observe method voltage and power balancing is achieved effectively.With the bidirectional-port voltage being controlled in a linear relationship with the output voltage, autonomous output voltage sharing has been realized both in steady-state and during dynamic progress.

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Paper Code
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TITLE:

IOT based solution for monitoring of pollution through pesticide in fresh fruits and vegetables available in markets

AUTHORS:

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[1]Assistant Professor at Aarupadai Veedu Institute of Technology, [2] [3] [4] Students of Aarupadai Veedu Institute of Technology

ABSTRACT:

Many wireless technologies have been used for sensing, tracking, etc. in environment management. Fruits and vegetables used in commercial agriculture has led to an increase in farm productivity. Despite the wide ranging benefits of using fruits in agriculture, several incorrect applications can result in high and undesirable levels of the compounds in the produce that reaches consumers. With the help of Arduino and colour sensor is used for sensing the condition of fruits or vegetables can also be determined. Using colour sensor we are proposing a system. With addition of that, the LCD is used for indicating the pests present in fruits and vegetables. The problem shows through LCD and make aware that How much Percentage is present in fruits and vegetables.

Keywords*: Colour sensor, buzzer, LCD Arduino.*

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INTRODUCTION:

The detection and/or recognition of an object can be identified based on the color which is an distinct surface property when it is used as an attribute of the feature vector. The image is largely affected by the illumination conditions and the spectral characteristics of the camera sensor itself hence the degree to which a colored object appears distinct in the image . The camera spectral filters are usually designed to satisfy multiple constraints and in most of the cases they are made spectrally broad so that they will have sufficient response in normal lighting conditions. There exist high correlation between color responses in such cases and this design gives rise to a high degree of redundancy in the measurements of color.

In the case of spectrally overlapping filters the Colors appear pale. Additionally, some camera sensor are made of spectrally separated (non-overlapping) filters, thus delivering high quality color responses. The disadvantage of such filters is that it requires high intensity light sources to produce significant responses of the sensors which are responsive in a narrow spectral domain. Color is an important property for a fashion material like leather. To meet the requirements of the bulk order from a buyer who also specifies the color in tune with the fashion demand, a large number of leathers need to be produced in a particular shade in batch process, with the reasonable level of accuracy. But this is technologically challenging due to the heterogeneity of the raw materials, hides and skins and quite often, a large variation is inevitable despite good quality control in the dyeing process. The leathers are

usually assorted into groups of colors with acceptable tolerance levels prior to the cutting of components during product manufacture and this is currently being done manually by experienced assorters.

This is necessitated by the fact that good quality leather products should have all the cut components in the same shade, or otherwise liable to be rejected even if they fulfill all the other quality parameters. The inter-communicating or inter-networking of physical devices, embedded with electronics, software, sensors, actuators,vehicles, buildings and other items and network connectivity that enable these objects to collect and exchange data is formerly known as Internet of things (IoT). It melds together physical objects, virtual objects, living beings, user interfaces and analytics all interconnected over an internet-based infrastructure. In recent years, increasing amount of video cameras have been appearing throughout, including surveillance cameras for security, maintenance, management, healthcare and many critical purposes.

BLOCK DIAGRAM:

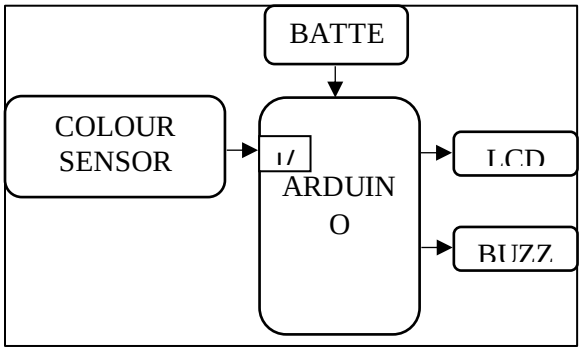

Fig. 1 Block diagram of proposed design

PROPOSED SYSTEM:

In this proposed work we are going to detect the degradation of fruits or vegetables depending upon their variation of colour. The colour sensor will identifies the fruits or vegetables for instance if the rotten tomato colour differs from the typical good quality tomato. And by using Arduino MCU we are implementing this and additionally we are placing a LCD screen from which it can visually the result of the products clearly as a display screen. And if any of the product fails a buzzer is fixed so that it can give an alert signal to the vendors or users.

HARDWARE DETAILS:

- Arduino MCU
- Battery (or) USB cable
- LCD
- Colour sensor
- Buzzer

SOFTWARE REQUIREMENTS:

- Arduino IDE
- Embedded C

CONCLUSSION:

And we have presented the identification of fresh fruits and vegetables using colour sensor. So that the usage of good fruits can be accomplished using our proposed work. This scheme of proposed design will be very useful for various super markets and groceries stores. And for the blind people it is very useful.

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Design of Smart Home device to regulate various appliances using IOT

AUTHORS:

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ABSTRACT:

In this paper an affordable & user friendly remote controlled smart home device is introduced with Arduino UNO board, smartphone, electric loads & relays. This suggested system uses a mobile application that enables clients to monitor household appliances via IOT. Today some of the conventional home control programs were designed towards particular uses while the new system is a general purpose smart home system. That can be easily incorporated through established structure. The proposed solution seems to have more functionality than standard home monitoring systems which are operated with Bluetooth. This article also outlines the framework, potential research, & complexity of the hardware & software design. The planned home automation device model is being introduced & tested on devices, exact and planned outcomes have been given.

Keywords- *Home automation; Smartphone; Arduino; IoT.*

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Keywords- Home automation; Smartphone; Arduino; IoT.

I. INTRODUCTION

Smart home software consists of using IT & electronic systems to reduce global labour. The technological growth is driving everyone to use applications for online control of electrical appliances. Online system will run with ease, consistency and as low a failure rate as possible [1]. The concept of a smart home program is a major problem for organizations interested in innovation & home appliances. The automated software not only helps minimize physical labor but also saves time and energy [2-3]. Modern connected home systems have been used in job-saving machinery and nowadays their primary function will be to provide facilities for the elderly and the disabled to carry out their everyday tasks and track the household appliances remotely.Study on Allies in Business Intelligence (ABI) [4]. Allied Business Intelligence (ABI) research estimates that nearly 5 million automated house electronics are built in the USA in 2012 & their growth rate is 50%. Various innovations like ZigBee in remote smart home system [5]. A Bluetooth-centered mobile home automation system can be purchased at reduced cost & easily installed in an existing home [6-8]. A pioneering work has shown that Bluetooth is quicker than cellular / GSM systems. Bluetooth tech has the ability to communicate up to 3 Mbps of data serially across a physical range of 10 m to 100 m based on the Blue tooth device size[9]. The suggested solution discusses implementing a robust, cost-effective, and tenant-friendly smart home platform through IoT. The design of the proposed model is based on the usage of Arduino board, electric

loads & smartphone. The network communication with the Arduino board is interfaced through USB cable from the Computer and also the home appliances are linked via relay to the Arduino board. The smartphone application is being used to communicate serially between the mobile & the Bluetooth panel, that is further connected to the wall. The current system still has the ability to monitor the equipment globally. That's why most sophisticated smart home systems are built for older people, people with disabilities or for any particular purpose. Not only is the recommended solution suitable for the elderly and the disabled, it also includes a multifunctional smart home unit that could be conveniently integrated in every homes.

II. PROPOSED SYSTEM

The device suggested has two central hardware and software components. The hardware portion consists of three component smartphone, Arduino board &v USB CABLE hardware modules. The software portion consists of Arduino (IDE) & BLYNK framework that is used for wireless technology between the smartphone & Arduino board. Fig.1 Diagram block of planned home automation system.

BLOCK DIAGRAM:

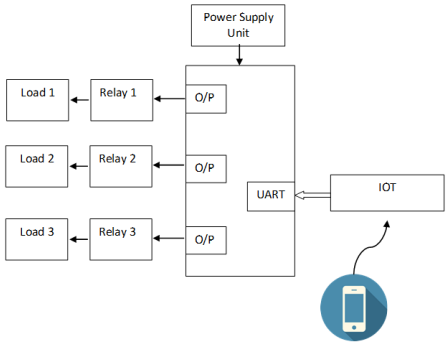

Fig.1 Block Diagram of the suggested system

III. FLOW DIAGRAM

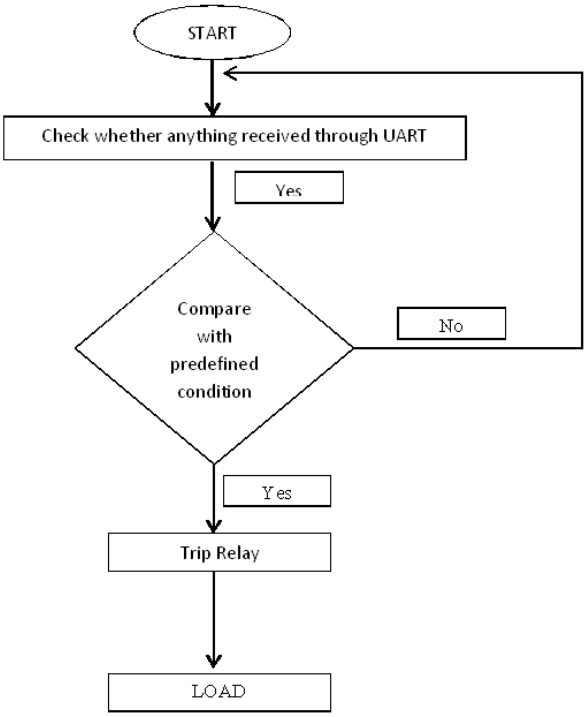

Fig.1.2 Illustrates the Flow chart of the suggested system

IV. RESULTS & DISCUSSIONS

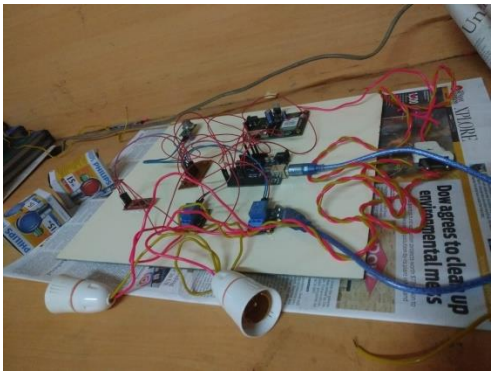

Fig.1.3 Implementation of the proposed device with hardware

The above fig.1.3 illustrates the hardware implementation of the suggested system which constitutes of Arduino Controller, Relays, Bulbs(Load),USB cables used for network connections.

V. CONCLUSION

This research paper offers an accessible & user-friendly idea over a smart home device. That has better resolution than current conventional smart home systems based on Bluetooth, providing a basic home management solution that isn't very suitable for the aged & the disabled, as well as helps to reduce labor & save power with the aid of sensing devices. The mobile software used in the proposed application actually enables interfacing of many loads. The proposed device is evaluated and tested within 20 metres, achieving 100 percent accuracy. The solution proposed can only track large-scale devices, it is suggested that certain detectors be incorporated for potential development research, and it should be a cheap & easy interacting system. Additionally, the smart home system may can be interfaced with other intelligent sensors like door lock, solenoid valve for gas detection, flow sensor to monitor water consumption level etc. where all these parameters can be viewed through a common platform.

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TITLE:

Design and Development of Circuit for Gas Leakage Detection

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ABSTRACT:

A gas detector is a device that detects the presence of gases in an area, often as part of a safety system. This type of equipment is used to detect a gas leak or other emissions and can interface with a control system so a process can be automatically shut down. A gas detector can sound an alarm to operators in the area where the leak is occurring, giving them the opportunity to leave. This type of device is important because there are many gases that can be harmful to organic life, such as humans or animals. The main propose is to design and develop gas leakage detection and sending a SMS alert system. Gas detectors can be used to detect combustible, flammable and toxic gases, and oxygen depletion. This type of device is used widely in industry.

More recently, infrared imaging sensors have come into use. All of these sensors are used for a wide range of applications and can be found in industrial plants, and refineries.

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VI. INTRODUCTION

Gas leakage poses great danger in this modern era where the use of gas has become an important source of energy for industries, homes and vehicles alike. The leakage of Liquefied Petroleum Gas (LPG) is known to cause serious accidents which have resulted in loss of lives and properties worth billions of dollars across the globe. LPG is one of the most commonly used fuels in India and as such precautions have to be taken in order to safe guard against accidents such as explosions and suffocation that are associated with its usage.

LPG is made up of mixtures of propane and butane which are inflammable chemicals. Due to the odorless nature of these chemicals, Ethyl Mercaptan is added as odorant in order to make the gas detectable by smell. However, some people have poor sense of smell especially at low concentrations and so a more effective and reliable means of detecting the gas has to be adopted in homes, industries and vehicles that rely on the use of LPG.

VII. PROPOSED SYSTEM

Design and Development of Gas Leakage Detection, Alert and Automatic Windows opening System we are achieving the project through MQ-2 sensor where it will sense the gases that present near it. So we use arduino software to write the functionality of the system how and when it should works by feeding code in arduino board.To design and develop a Gas Leakage Detection System and send an alert message, automatically open the windows. Our aim is to make a automatic gas leakage detection system and if the people are nearby them they can make preventive measures when they are not present so no to happen any fire accidents to avoid that we can send an SMS alert to the receiver and open the windows nearby it so that at least some amount of gas may go out from windows and save from fire accidents.

One of the preventive methods of stopping accident associated with LPG leakage is to install gas leakage detection devices. Even though there have been great strides in developing effective LPG leakages detection and response systems over the past years, there are still improvements that can be made to previous designs. Most systems developed focus on the detection of the leakage and sounding of an alarm in response to the detection. Other systems detect the gas and use a microcontroller to activate an alarm and also send SMS to the appropriate person. A much more improved version has a power fan installed for circulating the gas.

These designs even though prudent do not solve the

leakage problem. The purpose of this project is to design a system capable of detecting the leakage of LPG and automatically shutting down the power supply of the house. This device would also send an SMS through a GSM module to the appropriate authority for investigations to be carried out on the leakage, alert the Peoples inside the house through Buzzer and automatically opening the windows.

The system consists of a sensor (MQ-2) that is highly sensitivity to propane (C3H8) and butane (C4H10), an Buzzer, a UNO Arduino (microcontroller), a GSM SIM 800C module, two channel relay module, 16x2 LCD display and a Servo motor. This system does not only detect LPG leakage but shuts down supply to minimize wastage, accidents and cut down cost associated with the leakage.

III BLOCK DIAGRAM

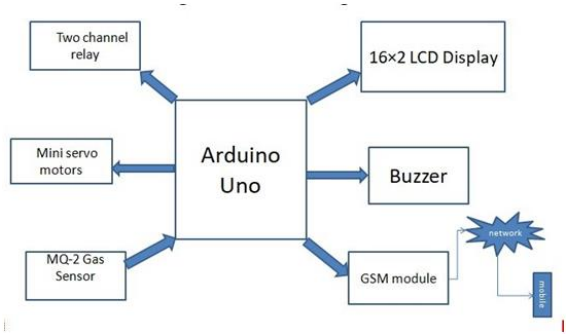

FIGURE 3.1: BLOCK DIAGRAM

3.2 WORKING PRINCIPLE

CIRCUIT EXPLANATION

1. This is the circuit for the gas leakage detection system that has MQ-2 gas sensor to the Arduino and connected to the bread board.
2. Next the LCD display (16*2) is interfaced to the arduino board to display the gas level and if the gas level increases it shows ‘gas is leaking’.
3. We also added a 5v buzzer so that it buzzes a sound when a sensor detects a gas leakage.
4. Then by using the GSM module connected to the arduino, when the gas leaks it also sends an alert message to the receiver.
5. We use the Arduino software to define pin Mode of buzzer, LCD display, MQ-2gas sensors.
6. Cable is connected to the Laptop to get power supply and upload the functionality of the code into the circuit.

MODEL EXPLANATION

1. This model is working on the logic of detecting a harmful gases present in the surroundings so that the sensor detects them and it sends a signal to the arduino board.
2. First we place the sensor to the system so that it can detect the gas which is present in (200-10000) ppm.
3. Then we are adding a LCD display and buzzer so that when the arduino gets the signal from the arduino the display shows the gas is leaking and buzzer starts sound to alert the system.
4. If the gas leakage is heavy and it starts sending an alert message by using GSM module to the receiver.
5. As there are no one present around it will take automatic preventive measures so that the power of the house shutdowns so not to happen any fire accidents.
6. Finally after sending an alert message and power goes off and the windows opens by using mini servo motors.
7. After the leakage stops it also again sends a message tells that gas leaking is stopped.

IV SIMULATION OF THE MODEL

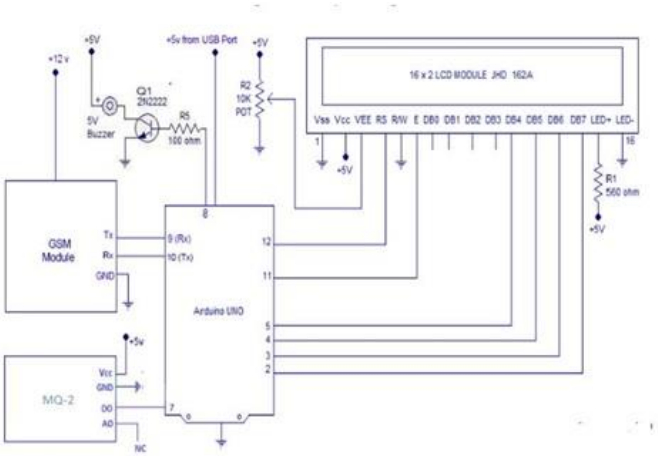

FIGURE 4.1: CIRCUIT DIAFGRAM

This is the idea how we want to implement the simulation model for working. By this we have an idea how to develop the model using the cardboard.

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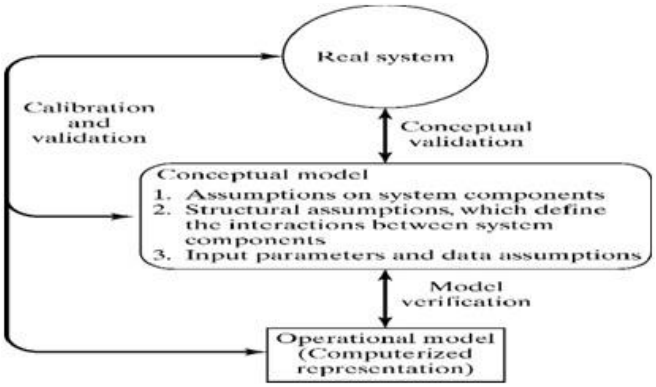
4.1 IMPLEMENTATION OF REAL MODEL:

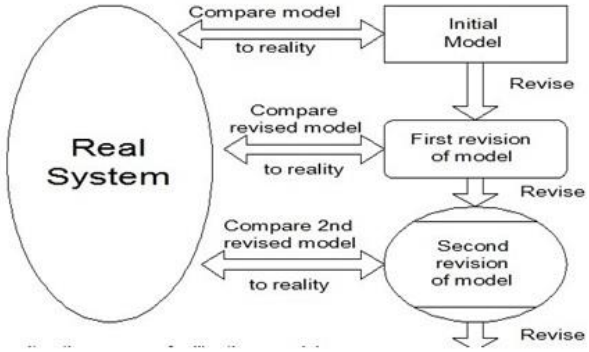


4.2 STEPS IN MODEL-BUILDING

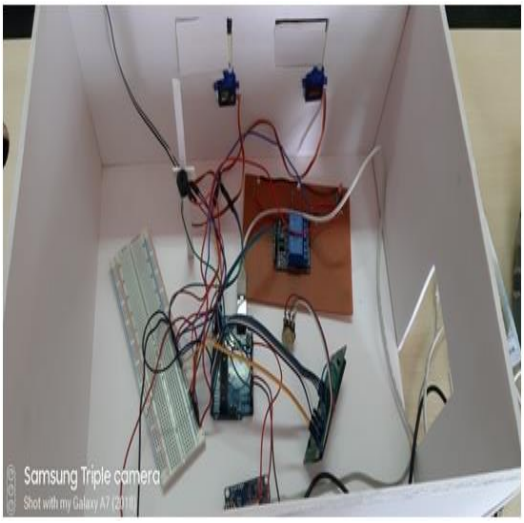
- ✓ Observing the real system and the interactions among their various components and of collecting data on their behavior.
- ✓ Construction of a conceptual model.
- ✓ Implementation of an operational model

- ➢ Have someone else check the model.
- ➢ Make a flow diagram that includes each logically possible action a system can take when an event occurs.
- ➢ Closely examine the model output for reasonableness under a variety of input parameter settings. (Often over looked!).
- ➢ Print the input parameters at the end of the simulation, make sure they have not been changed inadvertently.
- ➢ Make the operational model as self-documenting as possible.
- ➢ If the operational model is animated, verify that what is seen in the animation imitates the actual system.
- ➢ Use the debugger.
- ➢ If possible use a graphical representation of the model

4.3 CALIBERATION AND VALIDATION OF MODEL



4.4 HARDWARE SETUP:



4.5 TESTING AND ANALYSIS

- ❖ The above pictures are the simulated models for the real world model, where we developed the model according to the steps discussed above.
- ❖ Testing is the crucial part in the model, where we need to test the model in different aspects by giving inputs of different values and observing the results provided by the simulated model, we need to analyse the result such that the model should produce the accurate result without any fault, where it is predominant to work in real time system.
- ❖ For that we need to create a test cases that should be implemented on the model and note the results provided by the model. Where we can say it is working properly and suitable to real world system or not.

4.6 TEST-CASES TO CHECK

- **DETECTION OF GAS BY SENSOR:** To check this test case we need to release so amount of gas near to the sensor and check is the sensor is detecting the gas or not, this can be identify by seeing the detection light on the sensor.
- **WORKING OF LCD DISPLAY AND BUZZER IN PROPER WAY:** We need to check the LCD working by giving proper delay for each component in arduino and check buzzer is buzzing for the given delay or not.
- **SYSTEM WORKING WHEN THERE IS NO GAS LEAKAGE:** When there is no gas leakage the LCD display should show the gas level is normal.
- **WORKING OF POWER SUPPLY AND MINI SERVO MOTORS:** When the sensor starts detecting the gas the power supply of the house goes off and automatically windows should open by using arduino voltage.

V RESULTS

Message received to mobile when gas leaks & intimating after stops

FIGURE 5.1: MOBILE SNIPPER

VI CONCLUSIONS AND SUGGESTIONS FOR FUTURE WORK

CONCLUSION

- ✓ The main objective of this project we conclude that the gas leakages in households and industries cause risk to life and property.

✓ So here our project will provide a solution to prevent such accidents by not only monitoring the system but by also switching off the main power and gas supplies in case of a leakage. Using MQ2 sensor gas leakage will be detected .So basically it is useful project.

SUGGESTIONS

The model can be extended further in future such as adding various sensors like fire sensor, PIR sensor.etc.so that we can total automation detection and alert system.

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